

Making Ferns Feel at Home

WILLIAM P. ALEXANDER

HALF-HIDDEN in the cool wooded hills of Allegany State Park in the southwestern part of New York State lies the Allegany School of Natural History where, in 1932 a wild garden of ferns was begun. Originally designed as a project of the nature study class and for the use of students in this "School in the Forest," it is today a mecca for nature lovers and science teachers and one of the show places of the Park itself.

The Fernery is a collection of all the ferns and fern allies native to Cattaraugus County, New York, with a few brought in from other localities to make the several natural groups introduced more comprehensive. This circumscribed fern garden was located to form part of the attractive Nature Trail established at the School.

Ferns, because of the delicate lacy foliage which characterizes so many of them, are generally regarded, and justly so, as the most beautiful foliage plants to be found anywhere on our globe.

Their ancient lineage also adds to their interest, for fossil ferns exhibiting all the grace and perfection of present-day forms may be found in the extremely old Devonian rocks of Western New York and elsewhere.

The student and plant-lover recognizes in ferns and their curious allies—the club mosses, horsetails, and others—an antiquated type of structure and fruiting which seems perfectly to accord with the notion that these plants are among nature's earliest efforts to produce a higher order of vegetation. In the business of producing foliage nature made her supreme attempt in the

fern group, but in the matter of fruiting she has let these lovely plants lag far behind the more modern seed-bearing kinds.

Ferns and their allies, being flowerless, produce no true seeds, but in reproducing their kind they pass through a complicated life history in which there is an alternation of a sexual and a nonsexual stage or generation. From unfertilized dustlike particles, called the spores, which are produced on the leaves or fronds of ferns, a minute structure called a prothallium develops. Upon this eventually appear two sets of receptacles that correspond in a manner to the sex organs in higher plants and animals. There occurs in this generation the fertilization of a germ cell by a male element which results, not in the formation of a seed but of a body which immediately gives rise to a frond, the fern leaf familiar to most people in one or more species. These fronds in their turn grow the simple spores and thus constitute the asexual stage in the life cycle of the organism.

With the foregoing in mind it is not difficult to reason that ferns and other spore-bearers of the group must be very exacting plants which require special conditions in which to get a start in life. They are for the most part not only exacting in getting started but finicky as well in such important matters as soil, moisture, light, shade, and exposure to strong wind and beating rain. Some grow standing constantly in acid, water-soaked soil; others thrive only under alkaline conditions. A few flourish exposed to the full glare of the sun in well-drained soil; others perish if removed from constant shade; and cer-

tain tender species are blown and beaten down by wind and rain when these beneficial agents in nature become violent.

When it was decided to make a fernery at School, the conditions indicated above had to be unerringly met.

The choice of the fernery site was determined by a fortunate set of circumstances which brought to a focus a number of ecological relations favorable to the welfare of many fern species in a restricted area. In fact the site chosen, it was found, would support all the native kinds with the exception of those addicted to strictly alkaline soils and ferns favoring bogs and swamps.

The Allegany School is placed in the upper reaches of a beautiful wooded valley which is totally devoid of natural swamps or bogs and in a region where limestone is an unknown quantity. In 1926 a small lake was made by damming a mountain stream, and it is at the eastern end of this body of water that the fernery is located. There a stretch of low level land, from which the forest has been stripped, is flanked on the south by a ten-foot curving bank which in part is still covered by trees.

The level strip is made up of a deep clay loam surfaced with a thick humus layer, and this soil, due to its proximity to the lake, is now constantly saturated. The bank rising abruptly from the wet ground presents a similar soil condition, with the exception of being relatively poor in humus content and very well drained. Beginning with a miniature dell, densely shaded at all times, the high bank curves eastward with fewer trees and ends in an area entirely denuded and consequently exposed and sunny a part of each day. The fernery has a total length of a hundred and fifty feet, and a path which is a continuation of the forest Nature Trail follows the foot of the bank through the fern gar-

den and from end to end. To create conditions favorable to the needs of swamp and bog ferns a circumscribed peat bog was made bordering the path in the soggy level.

This small-scale artificial bog is twenty feet long and has a width of about three feet. A trench fully two and a half feet deep was dug, and this was filled with peat nearly to the top. When thoroughly soaked this mass, to which some rich forest humus had been added, was planted with typical bog vegetation, including wet-ground-loving fern species. To take care of the kinds which do best in a limy soil, rock work was built up in the bank to simulate natural outcrops, and limestone from other localities was brought in for the purpose. This was accomplished at the cost of much laborious effort, but the result was gratifying for in these miniature rock plantings we now have a number of ferns growing which commonly are found only on limestone ledges. The curious walking fern and the dainty maidenhair spleenwort are among the forms introduced in the fernery in this way.

The idea of assembling the spore-bearing vascular plants of Western New York in a limited area had its origin in what seemed to be a necessity for the purposes of instruction — the necessity of grouping the living plants where they might be easily studied and compared. Many of the species are rare, and some are confined to limited and widely separated localities, both in and outside the Allegany State Park. In the Fernery the students may view them repeatedly after a few minutes' walk from the School grounds.

In the Park six species of *Lycopods* or club mosses occur — a goodly number for any given locality. These survivors of a great plant group which flourished in the remote past are fern allies though mosslike in appearance.



The Christmas fern is found in the Fernery of the Alleghany School of Natural History (upper). Negative by Moose. The royal fern is seen in the Fernery of the Alleghany School of Natural History (lower). Negative by Moose.

Shining club moss, *Lycopodium lucidulum*; ground pine, *L. obscurum*; stiff club moss, *L. annotinum*; running pine, *L. clavatum*; trailing Christmas green, *L. complanatum* var. *flabelliforme*; and the spreading ground pine, *L. tristachyum* are the half-dozen species now growing side by side in the School fernery. It is a remarkable sight.

The stiff, hollow-stem, jointed plants known as horsetails are also botanically grouped with the ferns, and it taxes the belief of the uninitiated when they are confronted with the statement that horsetails must be regarded as true fern allies. It is only when the life history of such organisms is understood that such relationship can be fully comprehended. The life history of a horsetail is very much like that of the most typical fern.

The horsetails in the School fernery now include the field horsetail, *Equisetum arvense*; wood horsetail, *E. sylvaticum*; swamp horsetail, *E. fluviatile*; common scouring rush, *E. praelatum*; and the rather rare variegated, clump-forming plant, *E. variegatum*. Other species will be added to the collection as opportunity affords in the future.

The odd and but infrequently seen adder's-tongue, *Ophioglossum vulgatum*, has its place in the fern section and attracts much attention.

In situations best suited to their several needs a number of kinds of moonworts and grape ferns, as they are variously named, have been introduced. These plants are small for the most part and not fashioned on the plan of the better-known ferns. Underwood's moonwort, *Botrychium Lunaria* var. *onondagense*; Wood's grape fern, *B. matricariaefolium*; the ternate grape fern, *B. dissectum* f. *obliquum*; the cut-leaved grape fern, *B. dissectum*; the lance-leaved grape fern, *B. lanceolatum* var. *angustisegmentum*; and the rattle-

snake fern, *B. virginianum*, complete the group as it is represented in the fernery at present.

The regal osmundas make a truly wonderful exhibit in the wet level soil beside the path. All three of these magnificent fern species have been planted and are known as royal fern, *Osmunda regalis*; cinnamon fern, *O. cinnamomea*; and Clayton's fern, *O. Claytoniana*.

For experimental purposes the rarely beautiful climbing fern, *Lygodium palmatum*, has been introduced from Massachusetts, and at an altitude of 1,800 feet in the wooded Allegany State Park seems to be well established and thriving.

The stateliest member of the group, the majestic ostrich fern, *Pteris nodulosa*, and its close relative, the sensitive fern, *Onoclea sensibilis*, form masses in the wet ground, while in the rock work opposite, the blunt woodsia, *Woodsia obtusa*, together with the dainty bulblet bladder fern, *Cystopteris bulbifera*, and its cousin, the brittle fern, *Cystopteris fragilis*, hang their graceful fronds. Naturally the Christmas fern, *Polystichum acrostichoides*, is also abundant.

The great shield fern group with members in the bog, in the shaded dell, and on the sunny bank, may be viewed in the following species: march shield fern, *Dryopteris Thelypteris*; New York fern, *D. noveboracensis*; Dodge's shield fern, *D. simulata*; crested shield fern, *D. cristata*; Clinton's fern, *D. Clintoniana*; Goldie's fern, *D. Goldiana*; marginal shield fern, *D. marginalis*; and the American shield fern, *D. intermedia*. The visitor will also find the long beech fern, *Dryopteris Phlegopteris*; broad beech fern, *D. hexagonoptera*; and the rather rare oak fern, *D. Linnaea*, taking their respective places under the trees.

The tiny bog supports a vigorous



The long beech fern, member of the great shield fern group, is found in the Fernery of the Alleghany School of Natural History (upper). Negative by Moose. Lady fern found in the Fernery of the Alleghany School of Natural History (lower).

swamp in the Virginia chain fern, *Anchistea virginica*, a plant which rarely fails to attract attention.

On limestone rock work the peculiar walking fern, *Camptosorus rhizophyllus*, shares a place with the diminutive maidenhair spleenwort, *Asplenium Trichomanes*, making a pretty exhibit, while hard by the ebony spleenwort, *Asplenium platyneuron*, sends up its stiff but pleasing fronds.

Other ferns in the collection are narrow-leaved spleenwort, *Athyrium pycnocarpon*; silvery spleenwort, *Athyrium thelypteroides*; lady fern, *Athyrium angustum*; maidenhair, *Adiantum pedatum*; bracken, *Pteridium latiusculum*; purple-stemmed cliff brake, *Pellaea atropurpurea*; common polypody, *Polypodium vulgare*; and the water fern, *Marsilea quadrifolia*.

Only five species of this group were found growing in the situation now occupied by the fernery, and these were the abundant American shield fern, the New York fern, the lady fern, the

Christmas fern, and the bracken. Today fifty kinds of the plants technically known as pteridophytes are located where the five held sway, and the collection embraces scores and even hundreds of each species.

The living specimens are fully labeled, and there is much pleasure in the wild fern garden making the acquaintance of its fascinating plant population. Won't you consider yourself personally invited to visit the Fernery as well as the two other wild gardens — the Indian Garden and the Water Garden — some time during the coming summer? The fourteenth season of the "School in the Forest" will find students from many states taking their college credit courses in field natural history in this outdoor school conducted by the Buffalo Society of Natural Sciences in cooperation with the University of Buffalo and the Allegany State Park Commission. School days begin July 1 and last through August 10, and the latchstring is out.

Water Lily, Golden West

Among the various new tropical water lilies that are being tried this year for the first time is the variety Golden West. It is too soon to be able to report on the size of truly mature blooms but it is not too soon to report that apparently this is going to be one of the continuous bloomers. In flower on arrival in late June, it has continued to the present with a steady succession of gradually enlarging flowers. The color is difficult to describe. It is not

yellow and it is not the same in all flowers so far. It is best when it appears to be the color of good home-made peach ice cream! It is therefore a faint yellow more or less suffused with pink. Planted in a tub with the older variety St. Louis, a clear pale yellow, it looks rather more pink than if alone.

It is a color that does not carry well unless in full sunlight. As this latter is a supposed desiderata of all tropical lilies, no more need be said.

Oriental Flowering Crabapples

DONALD WYMAN

ON THESE pages from time to time will appear a few notes concerning the oriental flowering crabapples. These are hardy wherever apples are grown. They are colorful in blossom during spring and again in the late summer and fall when they are in fruit. Some hold their fruits a greater part of the winter. The oriental species are not susceptible to the Juniper rust, so disfiguring to some of our native crabapples, particularly *Malus ioensis plena*. Though all members of the *Malus* clan are susceptible to scale, and may bear heavy crops of fruits only in alternate years, nevertheless they are decidedly ornamental. It is because of this that notes on some of the better species and varieties will be offered in these columns.

Malus floribunda: The Japanese crabapple is one of the most popular of all the oriental flowering crabapples. Of low, mound-like habit, it normally grows to a height of 20 feet; though it has been observed to grow to a height and width of 30 feet. It is particularly valued for its massing effects since it is clothed entirely to the ground with branches. The flowers and the resulting fruits are very numerous. The buds are usually a deep carmine but as the flowers gradually open they fade to pale pink and finally to white. These inch-wide flowers appear, in the vicinity of Boston, about the middle of May, simultaneously with those of *Kerria* and *Cornus florida*. The fruits are about 1/4 inch in diameter, red in the fall but gradually turn a brownish color. *Malus floribunda* is one of the oldest crabapples in cultivation, having

been introduced into Leiden, Holland, by von Siebold in 1853. Strangely enough, its exact habitat is not known. E. H. Wilson did not see it in Japan, and Japanese botanists are unfamiliar with it. Regardless of the fact that its origin is obscure, it is in our gardens and is being justly appreciated.

A clonal variety of *M. floribunda*, originating at the Arnold Arboretum, has been called the "Bob White" crabapple. It is identical with the species in every way, except for the fact that the fruit remains on the tree a greater part of the winter. The fruit of *M. floribunda*, though it may remain on the tree several weeks in the fall, either falls off or is eaten by the birds long before winter, but the fruit of the "Bob White" crabapple remains on the tree through the entire winter. There is a large tree adjacent to the Administration Building of the Arnold Arboretum where this tree is closely observed. Sometimes in mid-January, when the ground is covered with several feet of snow and other food is difficult to find, as many as five pheasants can be seen at one time eating the fruit of this tree.

Malus arnoldiana: A chance hybrid (*M. floribunda* \times *M. baccata*), originating in the Arnold Arboretum before 1883, is *Malus arnoldiana*. It can be distinguished from *M. floribunda* in several ways. The leaves are larger and wider, its flowers are larger and a lighter color, and the fruit is golden yellow. From the landscape point of view, it is a superior tree with better flowers and fruits, but the mound-like habit is the same as that of *M. floribunda*.

Malus baccata: The Siberian crab-

*Arnold Arboretum**Malus arnoldiana*

apple is the oldest known of all the Asiatic crabapples, being introduced into Europe as early as 1784. It is a standard tree with a rounded or oval head, and pure white flowers that are very fragrant. The small fruits vary considerably, some being red and others almost pure yellow. Although all the crabapples are perfectly hardy in Boston (with the exception of the Parkman crabapple, which is injured somewhat during several winters), the Siberian crabapple is the hardiest of the Asiatic group, being widely distributed over the northern parts of eastern Siberia and of China.

Very prominent in Korea and northern Japan is the variety *mandshurica*. This tree, which may grow to a height of 50 feet, is a native of central Japan

and central China. *Malus baccata mandshurica* differs from the species chiefly because of certain botanical differences in the leaves and fruits. The fruit of the variety is nearly half an inch in diameter, while that of the species is less. Horticulturally it is of value for it is the first of all the crabapples in the Arnold Arboretum to bloom, the fragrant, pure white flowers appearing normally in late April. This year the plant was in full bloom on May 13. Unlike many crabapples, it flowers freely every year.

A most unfortunate practice among American nurserymen is the growing of crabapples from seed. Usually the seed is collected from plants in mixed collections, thus allowing ample opportunity for cross pollination. Yet, the



Arnold Arboretum

Malus arnoldiana

*Arnold Arboretum**Malus floribunda, "Bob White"*

seedlings are given the same specific name as the plant from which the seed was taken. As a consequence, there is no uniformity among the plants supposedly belonging to one species. For instance, fruits of *M. floribunda* are supposed to be red, yet there are many trees going under the name of *M. floribunda* in this country bearing yellow

fruits. The identity of many such plants is in doubt, and rightly so. The solution would seem to be either to have asexual propagation, or else to make certain that seed is collected from pure stands of individual species, which is frequently a difficult thing to do.

*Arnold Arboretum,
Jamaica Plain, Mass.*



Hoheria sexstylosa



Tibouchina semidecandra

The Arboretum in Golden Gate Park

ERIC WALTHER

BELOVED by all true San Franciscans, many of whom practically grew up in it, Golden Gate Park has always owed much of its charm and attraction to the great variety and unusual wealth of plantlife it displays. Its plant-collections can now count well over 4,000 species and varieties growing in the open; and demonstrate not only the superior advantages of our local climate, but also offer many valuable lessons to all students of nature, botany, horticulture, and all gardeners and homemakers as well.

In the past, the plant-collections of our Park unfortunately have been more or less scattered, making difficult their systematic study and appreciation. Within the last few years, however, steps have been taken which lead towards the ultimate creation of a definitely planned Arboretum and Botanical Garden, where our plant-treasures may be better cared for and displayed more advantageously. The area select-

ed for this purpose is located just towards the Southwest of the well known Japanese Tea Garden, where ultimately about 40 acres are to be developed.

The plans of the Park Commissioners were given definite form by the will of the late Mrs. Helene Strybing, which provides funds for the establishment of "an Arboretum and Botanical Gardens, to be located in the vicinity of the California Academy of Sciences, in which California Wild Flowers, and plants used for medical purposes shall be given special consideration: all plants to be properly labelled, etc."

Work was begun about 2 years ago, with the cooperation of the local offices of the Federal Works Project Administration; and today covers 8 acres of ground. This area has been cleared of superfluous or over-aged trees, the soil has been improved by grading, fertilizing, deep double-trenching, installation of a water supply, paths, stepping-stones and drains; and the erection of

a protective fence and gates. Subsequently well over 2,000 different kinds of plants, varying from 20 foot trees to minute Alpines, have been moved into this area, with an average loss of less than one per cent.

Space has been set aside to accommodate the collection of medicinal plants desired by Mrs. Strybing; their arrangement aims to stress, initially, those more decorative and colorful, with later addition of all which it may prove possible to grow here out-of-doors. Comfortable paths and seats have been provided for the visitor and student who should wish to spend some time here.

The remainder of our collections is at present arranged on geographical principles, largely to simplify the problems of maintenance and reduce the cost thereof. By grouping together all plants from the same source it becomes possible, for instance, to solve the water-question by the use of slowly-running sprinklers left on all night, without risk of overwatering any item.

Of the various geographical areas holding special interest to local gardeners the Australian section features several examples of the famous Waratah (*Telopea speciosissima*), expected to flower sometime in May. In the South American section a complete collection may be found of the various species and hybrids of *Escallonia*, including several of the writer's own hybrids; as well as many novel species of *Puya*, *Alstroemeria*, *Berberis* and *Crinodendron*. The South African area features many fine or novel Heaths, Proteads, various bulbs, succulents, etc. In the Mediterranean Region we can find an old specimen of Madrona, (*Arbutus canariensis*) which friends of the late Charles Abraham may remember from his old garden. In the Mexican section a fairly complete collection of Mexican *Crassulaceae* can be seen, largely gath-

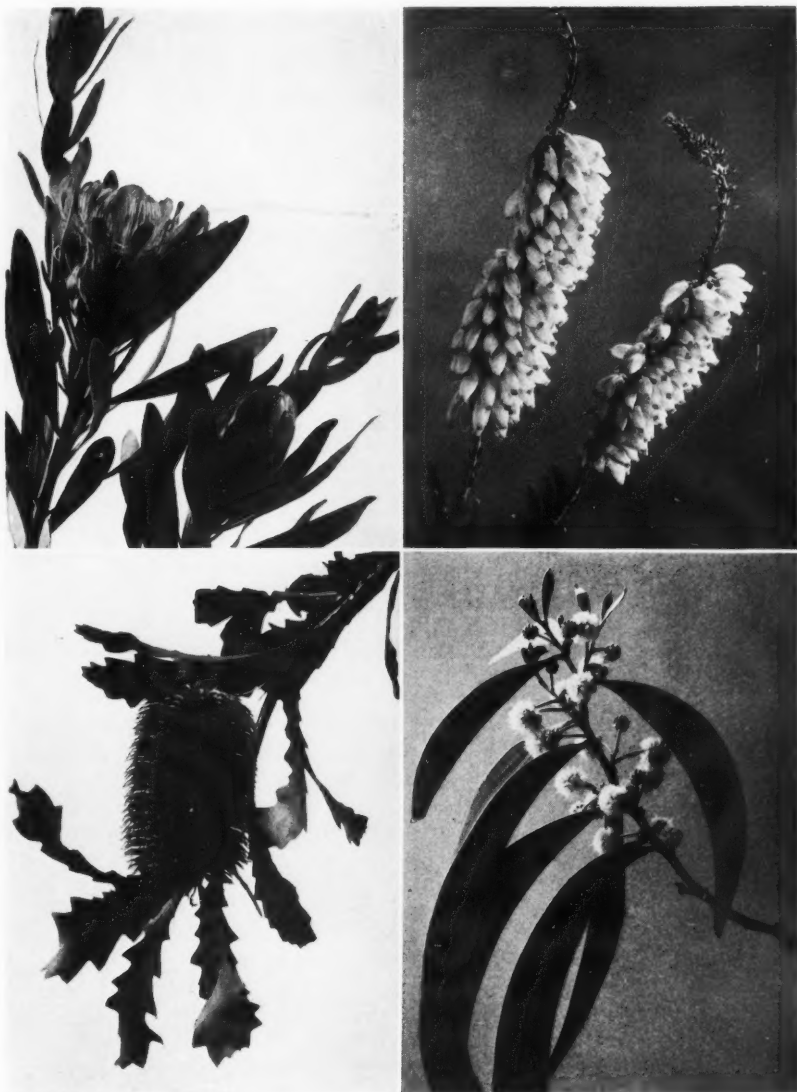
ered in their native habitat by the present writer. Here also are growing, so far successfully, 3 specimens of the famous Hand-tree of the Mexicans, i.e. *Cheirostemon platanoides*, also a novel yellow-flowered *Jacobinia*, etc.

New Zealand plants have always played an important role in the local parks and gardens. Their numbers received large accessions at the close of our 1915 Exposition, when the fine collection displayed at the New Zealand Pavilion found its way to the Park. Many of these very same specimens are now happily growing in these new grounds, of which we may mention the various kinds of the "Rata," (*Metrosideros spp.*), all known species of *Hoheria*, most of the Southern Beeches (*Nothofagus spp.*), and many more.

The section devoted to plants from Japan, China and the Himalayas is largely taken up by a collection, small but select, of new and rare Rhododendrons, Azaleas, Camellias, etc. Here is the original plant of Rhododendron "John McLaren," 15 years old, and now flowering for the last two years.

Here also grows the famous Pink Magnolia, which has aroused more interest and admiration than perhaps any other item growing here. This is generally conceded to be the finest of all Magnolias known. In its native home in the Sikkim Himalaya it attains a height, at times, of 150 feet, which fact may account for the delay in flowering the original plant which the Park imported from England in 1924. Since its removal to the new Arboretum site this Magnolia promptly set over 25 flowerbuds, which for over two weeks were expanding into what may safely be said to be the most spectacular blossoms bursting upon the local horticultural horizons.

While the area initially developed is still awaiting its finishing touches, in the form of path-surfacing, labelling of



Eric Waither

Protea susannae (upper left). The species of *Protea* most successful locally, flowering for over 10 months yearly in the new Arboretum. Its flowers may best be described as glorified artichokes; they are filled with honey, whence the name "Honey pots."

Erica Jubilee, one of the novelties introduced through the efforts of the Arboretum staff. While this came from New Zealand, its parents are species of the Section *Mammosae*. It's over 1-inch long rose-colored flowers last well when cut (upper right).

Banksia quercifolia (lower left). In Australia the family *Proteaceae* probably reaches its most extensive development. This species combines leaves like an oak with bronze-colored flowers in a bottlebrush-like head.

Acacia Koa (lower right). Of the peculiar phyllodineous acacias so characteristic of Australia's flora only two species extend beyond that continent, the one shown coming from Hawaii.

all plants, etc., just at present efforts are concentrated in improvement of another adjoining area to house the start of our California collection. After planting the fundamental framework of trees, this section will be made as colorful as may be possible by utilization, in quantity, of such flowering shrubs, wild flowers, bulbs, etc., native to California as may be expected to thrive here.

Further plans of the Board of Park Commissioners contemplate erection of a suitable structure, intended to serve as a really permanent Memorial to Christian and Helene Strybing; and to provide such desirable features as a garden library and reading room, class-

rooms and laboratories where Park employees desirous of increasing their knowledge of plants and horticulture may receive instructions, etc.

The management of the Park hopes that its efforts in the creation of an Arboretum and Botanical Garden will meet with such public approval and support that its future may be assured.

For the present, visiting hours are from 8 A. M. to 5 P. M. daily except Sundays and holidays. Any inquiries as to guidance, information on particular plants, etc., may be directed to Eric Walther, Assistant Superintendent in charge of the Arboretum, at the Park Lodge, Golden Gate Park, San Francisco.

Seed Saving

In all the talk that has been in garden papers of late about the necessity of saving tulip bulbs scarcely a word has been said anywhere about the pleasant task of saving seed of the spring bulbs that make so much more enduring a picture in the garden than do the tulips. It is now too late for most of us to save any this year but we might turn an attentive eye to the whole matter of seed saving. Too often the first failure is procrastination and the seed has fallen to earth before one notices. Even now, in some places a seed or two can be saved from many of the half-dried but open capsules of the grape hyacinths. The squills of the late-flowering groups still harbor a few seeds in their capsules and occasional crocus

seed can be found if one hunts it literally to earth. All should be sown at once in a spot where they can be almost forgotten except to see that they do not dry out but go through the varying wetnesses that would have befallen them in nature. If sowing is not done now, it should be done in autumn and the seeds allowed to feel all the changes of winter. If it is possible to sow them in a frame or cold greenhouse, germination will begin early in the new year and the hard business of waiting for the green of spring will be tempered by their appearance.

Lily seed should be watched and gathered as it ripens and then all the mass of technical papers should be studied for planting times.

The Taxonomy and Distribution of the Genus *Lycopersicon*

CORNELIUS H. MULLER

PLANT breeders are becoming increasingly concerned with the production of new varieties of tomatoes as the various tomato diseases cause progressively greater annual losses amongst growers. The production of suitable new varieties involves a search for plants demonstrating marked resistance to the diseases and other desirable characters such as size and palatability of fruit, shipping quality, early ripening, etc. These characteristics may be found in several different botanical species or varieties or in several strains of the same species. Breeding experiments involving a disease-resistant form with perhaps unpalatable fruit and a susceptible form with very palatable fruit have been made to yield a resistant hybrid with palatable fruit. So far only two species of tomatoes have been used for this purpose and in those two species there are doubtless many strains not yet utilized. The four remaining species of the genus have been almost entirely neglected and are just now being used for the first time as the result of an expedition to South America commissioned by the Division of Plant Exploration and Introduction of the Bureau of Plant Industry. The results expected from a comprehensive breeding program involving all these species are infinite.

In order that such a breeding program may be intelligently carried out it is necessary that a complete knowledge be had of all the species available for use. Not only is the identity of the

forms requisite but also a clear understanding of their relationships to one another and the closeness or remoteness of kinship. Although crosses between the most closely related species are easiest to make, those between more remotely related forms sometimes produce the most striking results. With this fact in mind the author undertook a taxonomic study of the various tomato species (Misc. Pub. No. 382, U. S. D. A., 1940). During the course of this work evidence was encountered in the distribution of the various forms which has led to conclusions concerning the derivation of the common cultivated tomato. Previous speculation on the origin (both geographically and phylogenetically) of the tomato have omitted from consideration any but the common tomato, its variety the Cherry tomato, and the Currant tomato.

The genus *Lycopersicon*, to which the common tomato belongs, is a small group in the family *Solanaceae*. It was regarded by Linnaeus in the *Species Plantarum* as a part of the genus *Solanum* to which it is undoubtedly very closely related. Miller in the *Gardener's Dictionary* in 1754 proposed the generic name *Lycopersicon*, a segregation which is now generally accepted. The genus is distinguished from *Solanum* by having its stamens adnate in a staminal column, while those of *Solanum* are distinct. *Lycopersicon* also has elongated apical staminal appendages adnate in a tube, enclosing the style. In *Solanum* staminal appendages

of this kind are lacking. The anthers of *Lycopersicon* dehisce by slits at least two-thirds their length from the apices toward the bases. In *Solanum* dehiscence begins with a distal pore which may elongate into a slit not more than one-third the length of the anther.

Lycopersicon at present consists of six species which fall naturally into two groups, the subgenus *Eulycopersicon*, the red-fruited tomatoes, and the subgenus *Eriopersicon*, the green-fruited tomatoes. The red-fruited group consists of *L. esculentum* Mill. with its varieties and *L. pimpinellifolium* (Jusl.) Mill. The group is characterized by its usually glabrous fruit which is red or reddish-yellow in color and by the absence of both bracts in the inflorescence and stipule-like organs with the leaves.

The green-fruited group consists of *L. peruvianum* (L.) Mill., *L. cheesmanii* Riley, *L. hirsutum* Humb. & Bonpl., and *L. glandulosum* C. H. Mull., with their several varieties. This group is characterized by its pubescent fruit which is green, greenish-white, or purplish-green in color and by the presence of both floral bracts and stipule-like organs with the leaves.

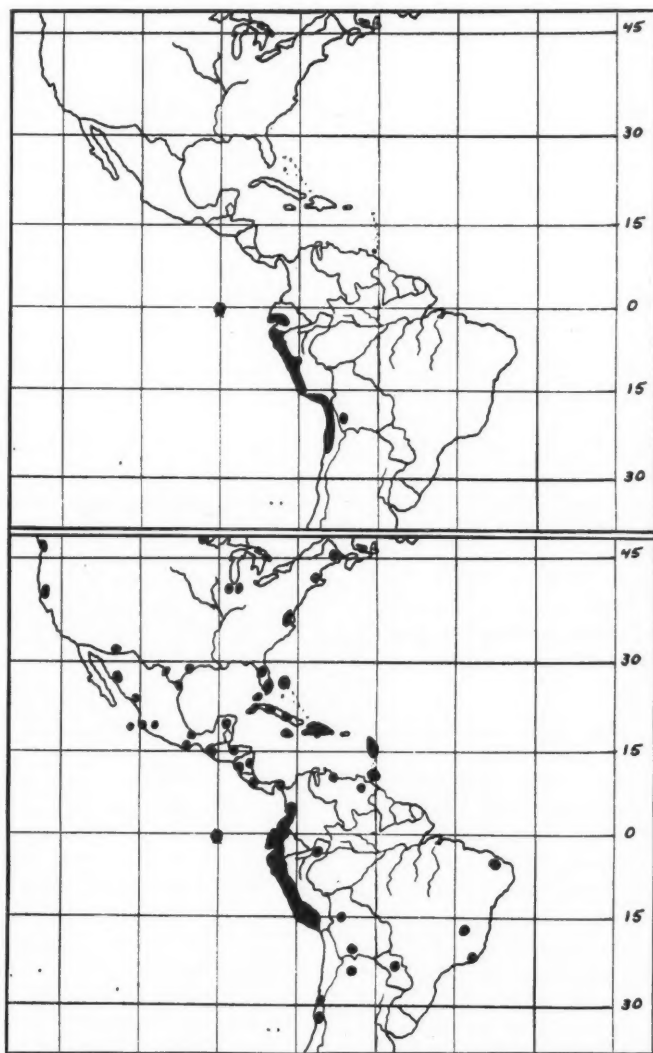
The distribution of the two subgenera differ widely from one another. The green-fruited group is confined to western South America, from northern Chile through western Bolivia and Peru to Ecuador and the Galapagos Islands. Although some of its constituent species are found in the lower elevations near the coast, the group tends to range in the higher elevations of the Andes.

The red-fruited group is concentrated in the same range described for the green-fruited subgenus, but red-fruited tomatoes are known in widely scattered regions. In addition to western South America, the lowlands of eastern Brazil, Venezuela, the Central American countries, Mexico, the West Indies, the

United States, and the warmer lowlands of Europe, Asia, Africa, and the Pacific Islands have yielded specimens. In the more northerly localities the plants encountered are obviously recent escapes, but those of tropical and subtropical America appear to be well established.

It is to be surmised that the present range of the green-fruited tomatoes in western South America is in general indicative of the original range of the entire genus. That is to say, the present wider range of the red-fruited tomatoes is the result of cultivation. Two facts contribute to this possibility. Firstly, the green-fruited species do not produce palatable fruit. Secondly, the wider range of the red-fruited group is occupied almost solely by the various forms of *L. esculentum*, the more palatable of the two red-fruited species. The wide range of the red-fruited group is thus the result of primitive cultivation in various Latin American countries and, more recently, cultivation all over the world.

L. esculentum, the common cultivated tomato, is known in the wild state only as an occasional escape. However, the variety *cerasiforme* of that species, which is known as the Cherry tomato, is found wild throughout the range of the red-fruited subgenus. From a study of variation in herbarium material collected in both the Eastern and Western Hemispheres, it is apparent that most exotic populations of *L. esculentum* var. *cerasiforme* were introduced as the cultigen, *L. esculentum*, and after escape have reverted to the less palatable variety *cerasiforme*. This presupposes the logical conclusion that the variety *cerasiforme* is the wild prototype of *L. esculentum* and that the typical form of the species is perpetuated only by cultivation. This conclusion was independently arrived at and substantiated by the field observa-



*The New World distribution of the green-fruited tomatoes, *Lycopersicon*, subgenus *Eriopersicon*, data compiled from herbarium specimens (upper). The New World distribution of the red-fruited tomatoes, *Lycopersicon*, subgenus *Eulycopersicon*, data compiled from herbarium specimens (lower).*

tions of Mr. Howard Scott Gentry of the Desert Laboratory at Tucson, Arizona, who discussed with me his experiences with escaped *Lycopersicon* in northwestern Mexico.

That the variety *cerasiforme* stands in relation to *L. esculentum* as the wild prototype of the cultigen is further evidenced by a comparison of the morphologies of the two forms. The cultigen differs from the prototype principally in the multiplication of its flower parts (and the resulting many-celled, larger fruit), the shortening of its raceme, and the greater robustness of its vege-

tative parts. Those of these characters which are not the result of cultural conditions have been shown to be mutations involving one or a few genes and have been observed to vary widely in horticultural forms. The gradual loss of these characters upon escape from cultivation results in the formation of the wild prototype, *L. esculentum* var. *cerasiforme*.

*Division of Plant Exploration and Introduction,
Bureau of Plant Industry,
Washington, D. C.*

Summer Note

In the midst of summer with the accompanying wealth of bloom it sometimes happens that in the great mass of effects, one overlooks combinations that are so striking that later one wonders how they were ever missed. *Prunus Pissardii* a charming very early flowering plum which has often been damned by the too-sensitive because of its ruddy purple leaves has always been associated in my mind with its pale pink flowering and spring. In passing recently there was noted a most striking combination in which the foliage of the plum made the picture where it overhung a blue hydrangea. The latter was not one of the uncertain blues that half regret not being pink; it was as green a blue as one finds in the Siberian squill. This with the green of a lawn made a color note that will not soon fade in memory. The hydrangea, needless to say was one of the old hortensias.

Among these old blue hydrangeas

there are many variants that might be worth looking up. Not all are the modern handiwork of Lemoine and others. Some have been here for many generations. In some of the oldest places as well as some of the most modern and astute one may still find the form in which the only sterile flowers outline the corymb with the same grace of pattern that one finds in the Japanese snowball in its original form.

The only other strong color combination that rises to mind, is one seen years ago in Japan where *Hemerocallis aurantiaca* in not too great masses gave its rich apricot flowers as accents to the blue. As both hydrangea and day-lily had been planted so that passing shadows from small trees moved over them, the combination was less garish than one might guess. The only discordant note was the fact that the whole sloped down to a pool filled with rose pink lotus!

Notes on a Few Early Flowering Lilac Species

HELEN M. FOX

IN 1880 beautiful species Lilacs were introduced from North China, in 1900 from Western China and in 1917 from Korea. They are not as dramatic, perhaps, as the hybrids but have a delicacy of line and color, and a delicious perfume which entitles them to a wider popularity than they now enjoy. With the exception of a few species most of them are absent from gardens where the Lemoine hybrids are found instead.

The hybrid Lilacs have to be increased from buds, grafts or cuttings. The species can be grown from seed in the words of the song "with the greatest of ease." This gives them their own roots and there is no worry about suckers forming from the stock or the scion dying off because it has not taken root. Moreover when plants are raised from seed the grower having nurtured them from infancy to maturity, knows them as he knows his own child and has the joyous feeling of having created them.

Seeds sown, indoors, in February produce seedlings large enough to transplant into the garden by September. "Indoors" would mean a hotbed or hothouse. The seedlings will come up in cold frames too, but may not be large enough to move into the garden the first autumn and have to be coddled in pots or flats in the cold frame over the first winter. The earth for the seeds in the flats consists of one-third top soil or compost, one-third leaf mold and one-third sand. Three-year-old plants will be two to three feet high according to the ultimate height of the species, taller ones being taller, and will bear a few flowers. By the fourth Summer they all show their future beauty and are large enough and sufficiently

floriferous to be effective in the shrubbery.

Frequently seeds from bushes growing in a mixed collection will not come true because the flowers will have been crossed with their neighbors, especially those closely related.

The loveliest of the species known to me and one of the handsomest of all Lilacs is *Syringa Palibiniana*. It was introduced into cultivation in 1917 and comes from Korea where it grows nine feet high. The shrub blooms with the flowering cherries. At Peekskill it has opened its flowers from May first in an early season to May tenth in a late one. The branches are woody and grey-brown, with lighter round dots on them. The leaves are shield-shaped and pointed at the apex. When young they have a glossy finish and are pale bronze or tawny ochre. This unusual coloring of the Spring foliage constitutes one of the chief beauties of the plant, because the leaves are so charming with the pale violet-blue panicles of flowers.

Four or more flower clusters are combined into one and measure almost a foot across. The clusters are dainty because of the delicate coloring and the space between the flowers caused by the length of the corolla tubes and the generous gaps between blossoms on the central stalk of the panicle. The flowers have a fragrance of Lilac, more like a perfume than a natural scent and in some years it seems as if there were a dash of Heliotrope in the fragrance. The flower stalks are softly downy with lines on them and are shaded faintly with magenta. The unopened buds are tinted rose violet. The corolla tubes

are $\frac{3}{4}$ " long and are a bluer violet than the corolla lobes. The lobes are wavy and measure $\frac{3}{4}$ " across.

In October the leaves turn rust over green-yellow and the veins are wine colored.

Another lovely species is *Syringa Julianae*. It was introduced in 1900, and comes from Western China and is quite hardy as are all the Lilacs described in these notes. Seed planted in February, 1934, in the greenhouse, germinated within a few weeks and produced seedlings large enough to plant out by September. By May, 1938, the bush only two feet high was in flower and by 1940 the plant was three feet high and in mid-May (perhaps earlier in other seasons) was entrancing with long panicles of violet flowers set far apart on the stalks. The panicles are sometimes compounded of three and measure to one foot long. Unfortunately they droop a little. But in color and spacing of the flowers they are charming. Each blossom has a corolla tube $\frac{5}{8}$ " long and the flowers measure $\frac{5}{8}$ " across at the tip. The tube is blue-violet and the lobes are pink-violet, and the buds too are tinted pink. The fragrance is of pure lilac.

When young, the leaves are tinted bronze green. They are almost triangular and terminate in a somewhat elongated point at the tips. The bases are rounded on either side of the center where the leaf dips into the stalk. The bush is said not to reach more than six feet in height, an advantage in a Lilac, where most of them grow almost too tall for the average border.

In 1880 *Syringa oblata* var. *affinis* was introduced from Northern China. The bush flowers early in May and bears fragrant small panicles of single lavender flowers, opening from pink tinted buds. The panicles are triple and measure 8" across. The leaves are shaped like those of *vulgaris* and when

young are shaded with faint brown maroon. The calyx and flower stalks are hairy. The tubes are $\frac{3}{8}$ " long and the flowers over $\frac{3}{4}$ " across. They are bluish-lilac tinted slightly with red and the petal lobes are hooded. The shrub resembles *Lamartine* but is not as handsome nor is it as pretty as *chinensis* but it is attractive because of the color and the compounding of the panicles.

Syringa oblata var. *dilatata* was introduced in 1917 and comes from Korea. It is an early bloomer, sometimes flowering the end of April. Mrs. McKelvey in her superb monograph says it varies much and that the fragrance is faint. Mine was exceptionally handsome and the flowers smell deliciously and decidedly of lilac. The leaves are soft, when young, pointed at the tips, almost straight across at the base and have very fine hairs on the central vein. They are 2" wide and $2\frac{1}{4}$ " long with a stalk $\frac{3}{4}$ " long. In autumn they turn vinous red.

The flowers are far apart in loose fairly large panicles 9" long and about 10" across which droop a little at the tips. The calyx is brown with bristly hairs and the sepals are pointed. The tips of the corolla lobes are slightly hooded and a little pointed. The tubes are $\frac{3}{4}$ " long and the flowers measure $\frac{5}{8}$ " across. The flowers on their shiny tubes open violet and fade lighter. The buds are Hay's Lilac and the expanded flowers are more roseate verging in Pale Laelia Pink.

A deliciously fragrant species is *Syringa velutina*, native to Korea and introduced in 1910. The shrub grows to nine feet high and branches outward. The lacy panicles of pale violet are so pale as to be almost grey and are short and graceful.

The branches are mummy brown and the young ones have a tone of green underlying them, while the old ones are greyer.

The shrub is leafy with leaves wider below the center, almost straight across the base and terminating in a somewhat elongated point at the apex. They feel soft to touch because of the soft hairs on both surfaces.

The flower panicles branch sideways a little, for two are always opposite one another. The flower stalks are dark maroon in handsome contrast to the flowers of pale lavender with buds tint-

ed lavender. The calyx is dark maroon and the filaments, also dark, show through the tubes like a shadow. The panicles measure 6" across and 4½" long. The flower tube is ¾" long and the lobes the same across. The corolla lobes are slightly hooded and pointed at the tip. The panicles are not large, and the flowers are white shaded light Vinaceous Lilac and the buds are white shaded pale Vinaceous Lilac.

Rhododendron Notes

CLEMENT GRAY BOWERS, *Editor*

Azalea Notes, 1940

WHILE ONE has always a certain, perhaps tepid, admiration for compilers and their work, and nearly always takes advantage of their labors with a minimum of appreciation, one would rather steer a middle course that would give him the advantage and yet save for himself the final agreement or disagreement. The notes that follow, therefore, record performance only in one place with notations that are not intended as judgments, although the note taker in this particular case knows quite well what he believes for himself.

Azaleas have been much to the fore of late and probably will increase in number because of the great ease with which many of them may be propagated.

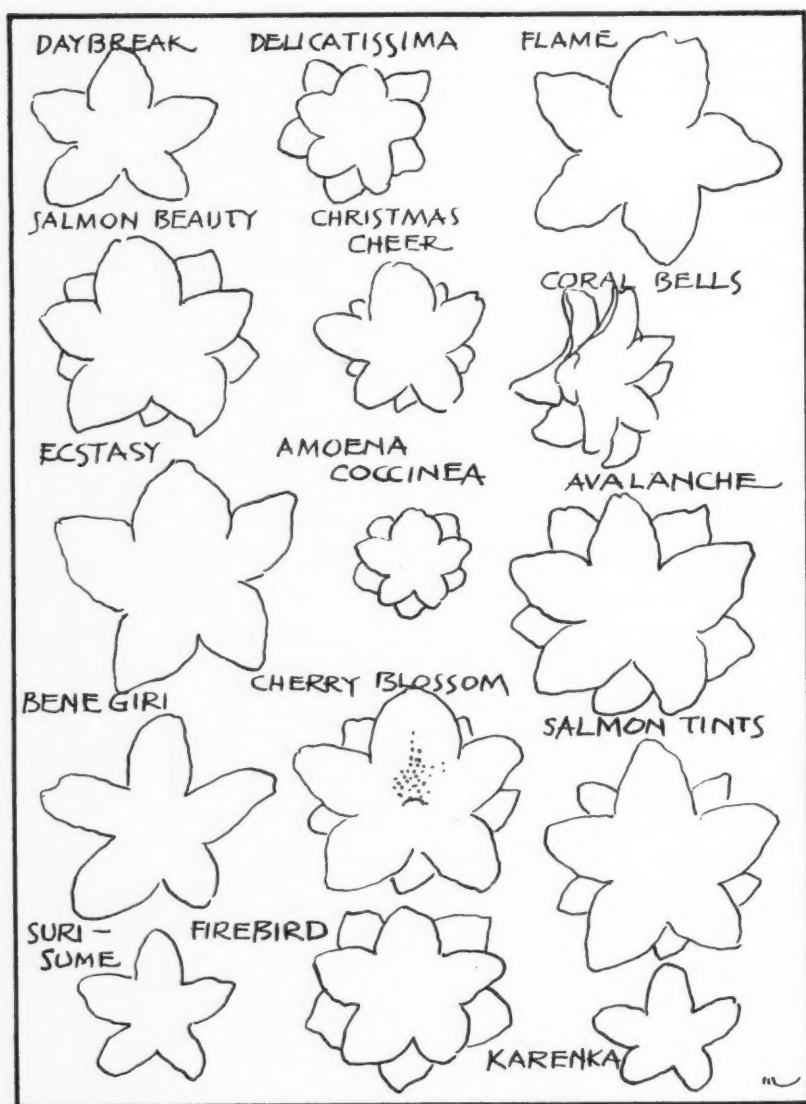
One of the groups that has come in for special attention is the group known as the Kurume azaleas, originally a great variety of clonal selections, but now a group that appears to be widened far beyond its proper scope.

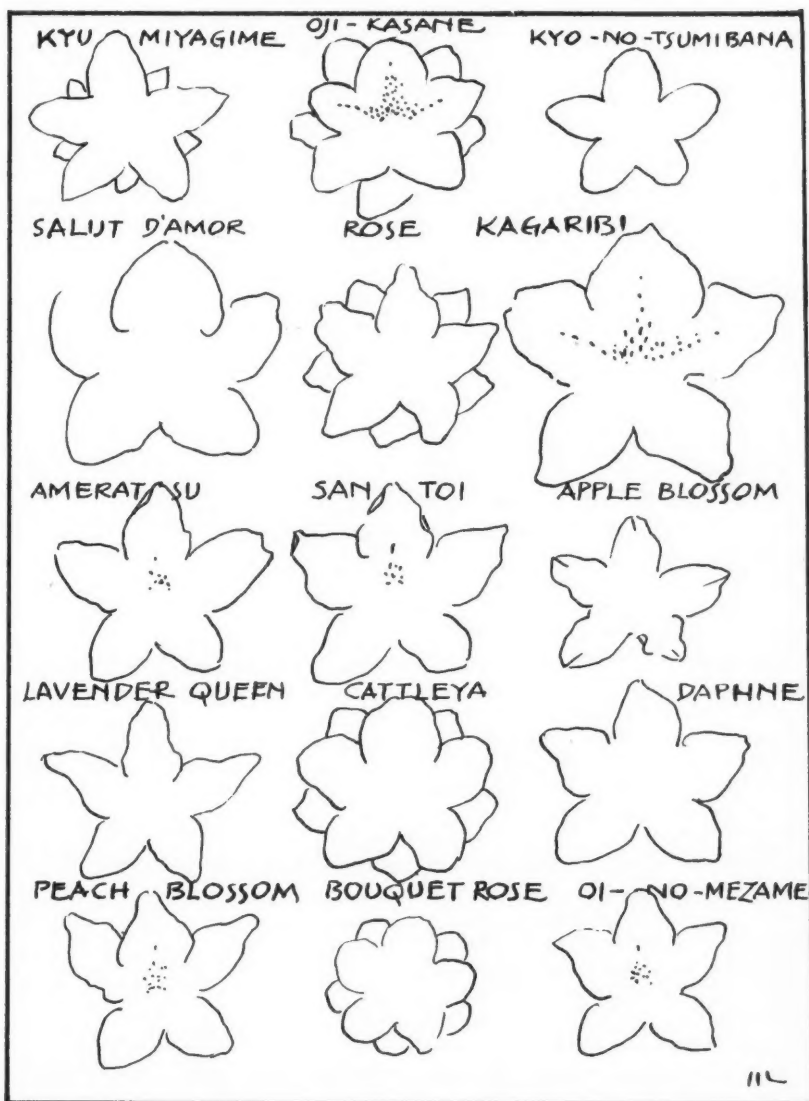
In its original state the prototype of this group (*Rhododendron obtusum japonicum*) seems to have been a twiggy, half-evergreen shrub native particu-

larly to the southern islands of Japan, with many variations in stature and habit, in flower color, size and form. According to E. H. Wilson, these variations became the special interest of Mr. Motozo Sakamoto, representative plants of whose collection eventually reached the United States in 1919. Before this time, the species had been known in this country only in such forms as *amoena*, *Hinodegiri*, *ramentacea*, and possibly *Benegiri*, *Yayegiri* and *Kirishima*.

Now in addition to the original set introduced through the Arnold Arboretum and since renamed with American names, there have been introductions through the U. S. Department of Agriculture, private parties, and some seedlings produced within this country.

It has been somewhat difficult to assemble all the named sorts that are offered and the notes that follow are probably incomplete. They will serve, however, for some other note taker who can do a better job. The reason for their compilation is simply that among the plants assembled there are some very obvious duplications and a number of plants that seem of dubious merit.





To record the data swiftly, simple drawings have been made to suggest the flower form. All are drawn natural size and "full face" except Coral Bells which is conspicuously tubular. The dots of the blotch which shows on some flowers are intended to suggest only the number and distributions. There are very few Kurume azaleas now available in which this pattern becomes conspicuous as in some other azalea and rhododendron forms.

The plants being observed are still too young to give dependable data on the ultimate growth habits. These are entirely omitted.

When one observes plantings of azaleas in flower, he will find that the colors fall into several general groups. Aside from the whites and tinted whites, we have a pink series, a salmon-pink series, a red series and a purple series.

Of the white sorts, those grown are Avalanche, Laughing Waters, Snow and Snowdrift. There is also a variety of Avalanche from Coolidge Rare Plant Gardens which appears to be a rather poor, starry-flowered seedling of *R. mucronatum* (often grown in gardens as *Azalea indica alba*). Laughing Waters is also *R. mucronatum*.

The tinted sorts are Cattleya, Cherry Blossom, Daphne and Oji-Kasane.

The purple series, which contains other than Kurume varieties although this is not clearly shown in some catalogue offerings, has: true Kurumes, Daphne (listed again because of apparent color in landscape), Lavender Queen, Mikawa-murasaki and Pitti Sing; hybrids of Kurume (?), Hortense and Sherwoodii; other hybrids, Dark Spring, Lantern Parade, Pageantry. From some personal experience, it would seem probable that all of these last two sets might be the result of crossing *Rhododendron obtusum Kaempferi* with *R. mucronatum*. All

of these named clones look like some of the progeny grown from that cross. Since Kaempfer's azalea is blood kin to Kurume azaleas it may be that a Kurume crossed with *R. mucronatum* gives this result also.

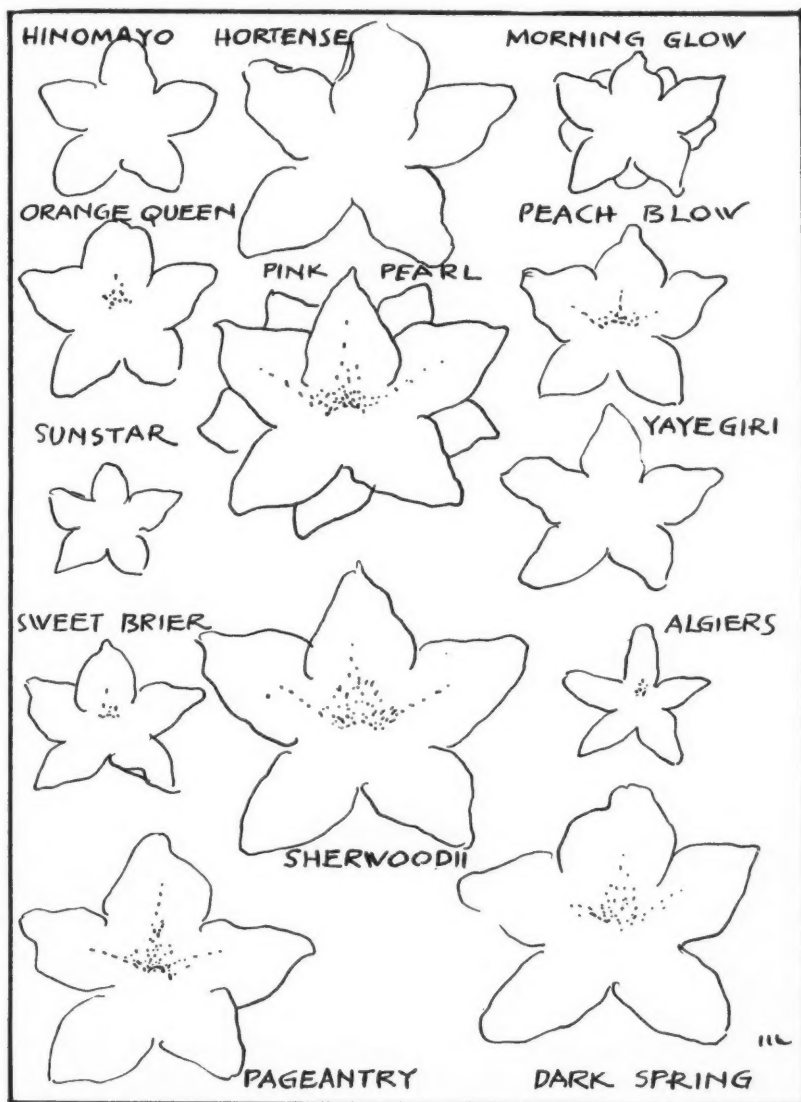
In the salmon-pink series, sometimes called orange, there are Oji-Kasane, Orange Queen, Peach Blow, Pink Pearl, Salmon Beauty, Salmon Tints, San Toi, Seraphim.

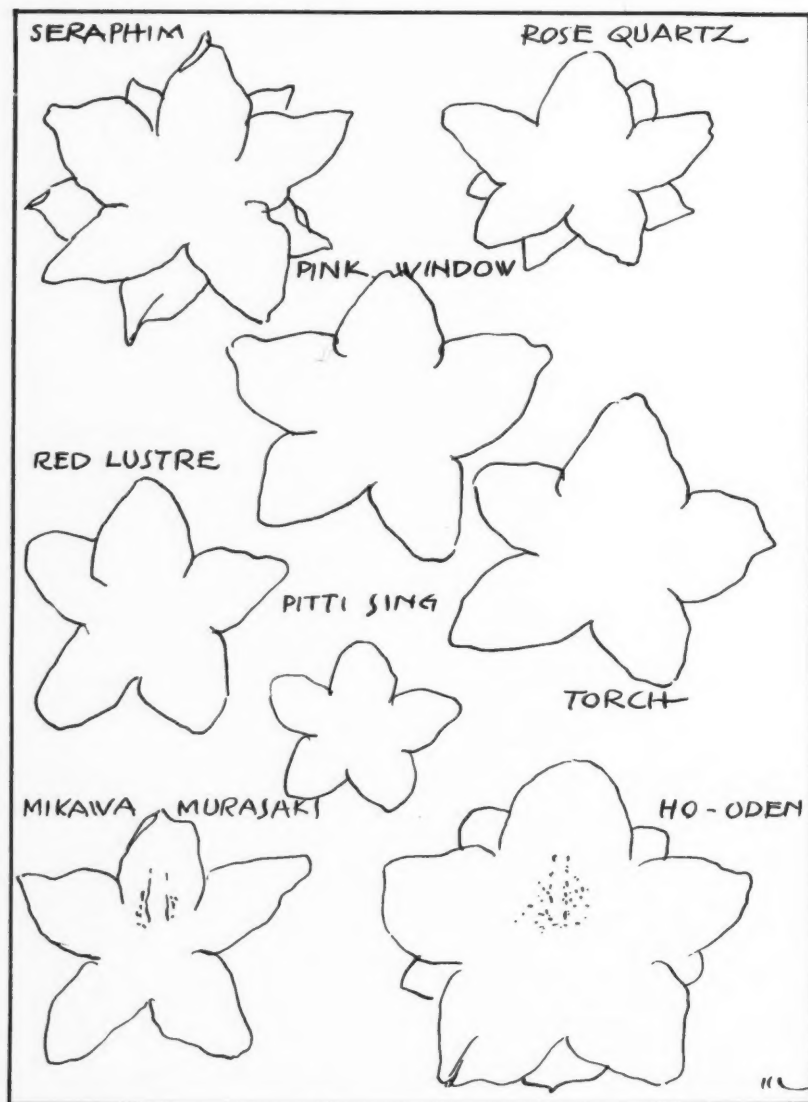
In the red (to scarlet) series, there are Coralie, Firebird, Flame, Flamingo, Kagaribi, Red Lantern, Torch, Yaye-giri.

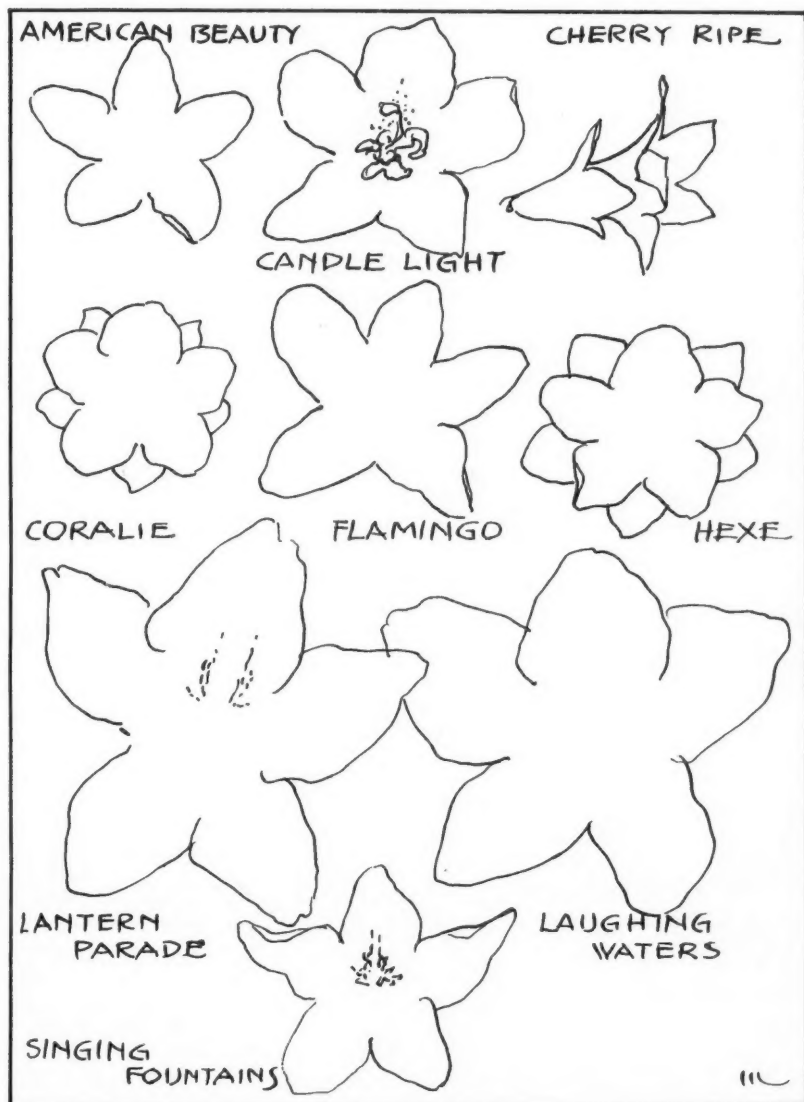
In the pink series one finds the greatest number of clones. Pink has been given its widest connotation but includes those types of pinks that have no quality of yellow and if any other hue is present it is a degree of blue, which is intensified would lead to lavender or violet or crimson. This presumably is the group at which the prospective gardener would look with most caution if he were to have limited space at his disposal. The varieties grown are: Algiers, Amoena coccinea, Apple Blossom, Benegiri, Bouquet Rose, Cherry Ripe, Christmas Cheer, Coral Bells, Daybreak, Delicatissima, Ecstasy, Hexe, Hinomayo, Karenka, Kyo-no-Tsumibana, Kyu-miyagime, Morning Glow, Oi-no-mezame, Pink Beauty, Pink Window, Rose Quartz, Salut d'Amor, Shimmer, Sweet Brier, Sunstar.

The Ridgway color notes are as follows:

Algiers, Deep Rose Pink to Rose Pink
Ameratsu, Rose Doree, shaded Scarlet
American Beauty, Tyrian Pink
Amoena coccinea, Tyrian Rose
Apple Blossom, Deep Rose Pink, shaded Geranium Pink
Avalanche, White
Benegiri, Rose Color
Bouquet Rose, Rose Color







- Candlelight, "soft honey", really pale salmon
 Cattleya, White washed Mallow Pink, outer hose, Amaranth Pink
 Cherry Blossom, White, edges flushed Cameo Pink
 Cherry Ripe, same color as Christmas Cheer
 Christmas Cheer, Rose Red
 Coral Bells, Deep Rose Pink
 Coralie, Rose Doree
 Daphne, white washed Pale Amaranth Pink, darker on edges
 Dark Spring, Redder than Pageantry
 Daybreak, Deep Rose Pink
 Delicatissima, Deep Rose Pink
 Ecstasy, Deep Rose Pink
 Firebird, Scarlet Red
 Flame, Rose Doree
 Flamingo, "brilliant coral"
 Hexe, Rose Color to Rose Red
 Hinomayo, Amaranth Pink to Deep Rose Pink
 Ho-oden, white faintly flushed Rose Pink, late
 Hortense, Light Mallow Purple
 Kagaribi, Scarlet Red tinged Nopal Red
 Karenka, Rose Color
 Kyo-no-Tsumibana, Rose Red to Tyrian Red
 Kyu-miyagime, Deep Rose Pink
 Lantern Parade, Redder than Dark Spring
 Laughing Waters, White (mucronatum type)
 Lavender Queen, Light Phlox Purple
 Mikawa-murasaki, Mallow Purple
 Morning Glow, Rose to Rose Red
 Oi-no-mezame, Deep Rose Pink to Rose Pink
 Oji-Kasane, white flushed Cameo Pink, see Cherry Blossom
 Orange Queen, Geranium Pink
 Pageantry, Liseran Purple, lightened to Phlox Purple
 Peach Blow, Cameo Pink
 Peach Blossom, Rose Color
 Pink Beauty, identical with Coral Bells
 Pink Pearl, Hermosa Pink flushed Eosin Pink
 Pink Window, Rose Color
 Pitti-Sing, Phlox Pink, deeper on edges
 Red Lustre, Nopal Red
 Rose, Nopal Red
 Rose Quartz, a paler Coral Bells
 Salmon Beauty, Begonia Rose
 Salmon Tints, Rose Red to Eugenia Red
 Salut d'Amor, Tyrian Rose
 San Toi, Chatenay Pink, edged Jasper Pink
 Seraphim, identical with Pink Pearl
 Sherwoodii, Rose Purple flushed Liseran Purple
 Shimmer, Rose Pink
 Singing Fountains, Rose Doree
 Snow, white
 Snowdrift, white
 Sweet Brier, Deep Rose Pink
 Sunstar, Rose Red
 Suri-sume, Light Phlox Purple
 Torch, Rose Doree to Scarlet (Kaempferi)
 Vesuvius, (Salmon red) flower buds winterkilled
 Yayegiri, Scarlet to Scarlet red

Old Rhododendrons.

At Mr. Sam Everitt's place on Long Island this spring, we were reminded how rarely one sees some of the old *catawbiense* hybrids that can still be had if one looks for them. Lady Grey Edgerton is still as handsome as when we saw it in 1915, with *album elegans* almost its equal and infinitely taller. Gomer Waterer can hold its own with some of the new Fortunei hybrids. All these are pale pinks to tinted whites. Amphion, F. D. Godman and Mrs. C. S. Sargent still command attention and Lee's Dark Purple should have its place in the strongest color passages.

Rock Garden Notes

ROBERT MONCURE, *Editor*

Old-fashioned Plants in Irish Gardens

WHY SO MANY precious old-fashioned plants should elect to grow happily and increase in Irish gardens is rather difficult to find out. Old Rectory gardens in particular seem to have more than their fair share of scarce treasures.

In King's County, now called Offaly, there was a rectory garden near our home where literally hundreds of white martagon lilies grew like weeds; another small garden near had every bed and plot in the vegetable garden edged with great borders of French Grey Double Primroses.

In a Kerry garden there are still a quantity of a curious scarlet and yellow gladiolus called "the Kerry Recruit," from the color of the uniform no doubt, and in this garden wonderful shrubs grow, notably a tall *Rhododendron fragrantissimum* which scents not only its own garden, but the whole village as well, with its strange cinnamon flavored sweetness.

In our own Rectory garden were great clumps of a deliciously sweet red tulip mixed with plants of double white narcissus, growing among ferns. Borders of double lilac and double white primroses were to be found in most gardens near, and cuttings of the old nutmeg wallflower with its little double yellow flowers were bestowed on special friends.

The Old Roses, Celeste, Maiden's Blush and Hebe's Lip grew by cottage doors in the village and most cottage gardens had large clumps of gold-laced polyanthus, curiously colored Auricu-

las, and Musk, which had a most wonderful scent.

These special treasures grew in undisturbed gardens and borders. In the case of Rectory gardens in the county, the Rector's man was often Sexton as well, and almost certainly had a cow and pony to tend, as well as boots to clean, water to pump up to the cistern, and other daily tasks, which left him barely time to cultivate the vegetables without bothering his head about "them there vinolias and piano roots in the habeas borders," and "the Misthresses little heirlooms in the rock garden."

The greatest treasures to be found now only after most diligent search, are the old double primroses and polyanthus. Many of them are quite lost, and certainly some of them dwindle even under the best of care, as they are certainly hard to please with soil and situation. It is said that one scorching hot day in summer will do them more harm than a month of frost and snow, in fact, hot sun shining directly on a plant will certainly kill it then and there. They must grow where they can have shade for the hottest part of the day and cool, deep loam at their roots.

Derncleughi or Tortoiseshell is a curious double polyanthus mentioned in Scott's novels. It is brown and gold in coloring.

Madame Pompadour is the queen of double primroses with lovely coloring and texture like dark red velvet. Curiosity is a very old double polyanthus with cream, brown and pink striped effect. Others are Burgundy, French Grey, Old Blush, with its delicate tint

of pink, Cloth of Gold, which has sheaves of blossom, Crimson King, with beautiful magenta coloring, Rose du Barri, bright pink, and Salmonea, soft pink. The Old Double Lilac is still a firm favorite, also the Double White. There are two extremely scarce kinds called Rex Theodore and Harlequin, which are difficult to keep happy.

A race of double Polyantha-primroses raised in Aberdeen by the late Mr. Cocker about thirty-five or forty years ago are strong growers; there are about fourteen of them still in cultivation, but some of them are hard to find.

Another set of rare primroses are the old named Hose-in-Hose: Maureen, a deliciously sweet creamy blossom, and the Ladies Dora, deep yellow like a wild cowslip, Molly, pave mauve, and Lettice, yellow and apricot, Old Vivid, bright red, and Canary Bird and Grandmother, yellow. The Hose-in-Hose blossoms are formed of two flowers, one within the other, which can be plainly seen in the illustration.

Jacks-in-the-Green have frilly green calyces of large size, like small leaves surrounding the flower, and often appear from chance seed in a good primrose garden.

Old Irish China Blue Polyanthus, a most rare single, was supposed to have been raised in the reign of Queen Elizabeth. Its coloring is unique among primroses, being pale cold blue, edged with white. It ramps like a weed in favorable situations, but is indeed a difficult treasure in the ordinary garden.

Barrowby Gem is not an old treasure, but must be mentioned for its delicious scent. It is a buttercup yellow single polyanthus and one sniff reminds one of the cowslip balls of childhood, which scent is also to be found strongly in Hose-in-Hose Lady Dora and

faintly in most other Hose-in-Hose and double primroses.

An eminent botanist has raised a strain of special seed from which it is possible to grow a small proportion of double-flowered primroses and polyanthus, in fact, from about half an ounce of this seed distributed last year, forty new double primroses were grown, many of them in completely new colorings, notably an "almost black," a tomato red and various yellow and mauves, some with edges of petals bordered with white, some with frilled petals, but all interesting and beautiful. Some of course are almost exact counterparts of well-known old kinds. Naturally there is only one seedling plant of each at present, but one of mine, two years old, has just been divided into six good hearty plants, with quantities of roots, so it will not be long before they are on the markets.

Having a batch of hybrid seedlings coming into flower adds a decided thrill to spring gardening, especially if care is taken of all weak, small plants, which experience proves are often those with double flowers.

While it is a risk to send plants far afield on account of delays en route, packing regulations and different climate and soil, seedlings will thrive, and a packet of seed may prove a far better investment. Most of the seedlings still have ordinary, variously colored single polyanthus flowers, but you may find a royal purple double blossom, as I did when I investigated a batch of plants yesterday, just coming into flower from seeds sown in May last year.

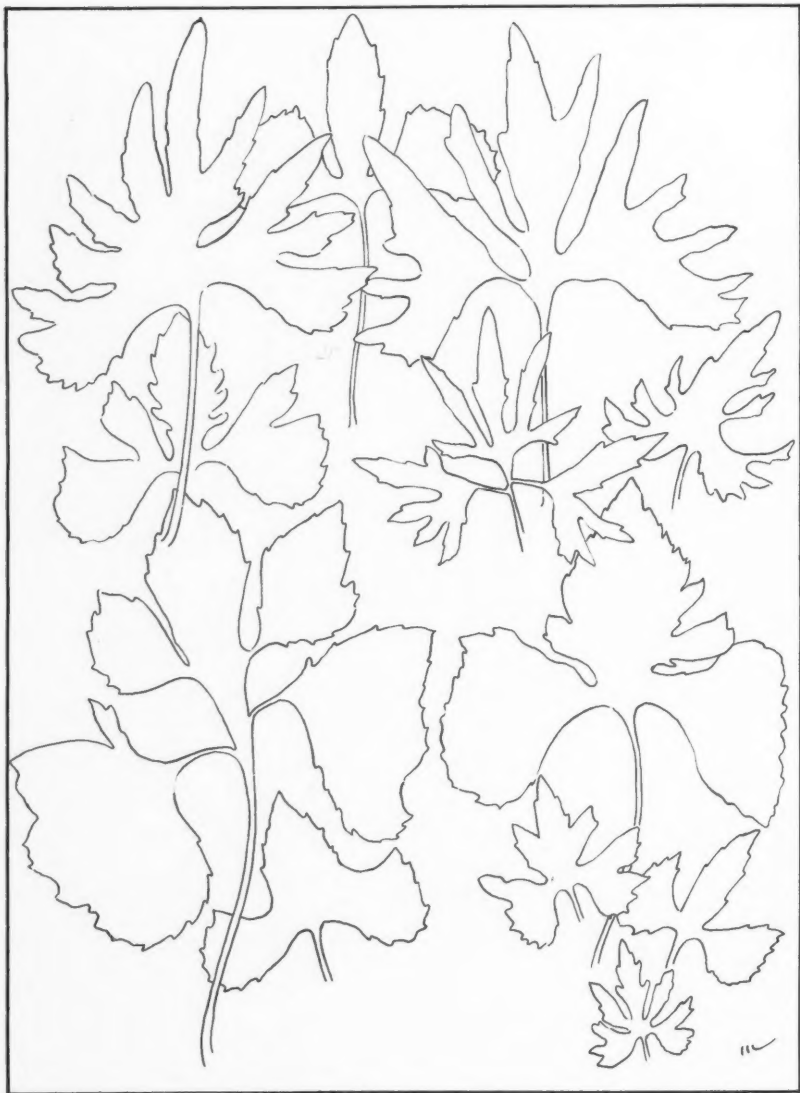
MRS. ANNETTE BARLEE,
Annefield, Dundrum,
County Dublin, Eire.

Leaf Variations in Viola

As one reads the descriptions for leaf shape in the Violets, especially those which are lobed or divided, one



Upper, left to right: Single, Blue Kenneth Laing; Double, Burgundy; hose-in-hose, Lady Lettice; Jock-in-the-green. Center, Double Primrose, Bonaccord Elegans. Lower, Double Primrose, Bonaccord Beauty.



Variations in leaf shapes, violets. Half natural size

reaches the conclusion that perhaps no group of plants is so highly variable in leaf form. There are many species of violet with lobed leaves and in some the character of the lobing is distinctive enough so that one can name the species from the leaf alone. In most cases, however, the shape and lobing of the leaves is so variable at different times of the year or even at any given period that it is almost a hopeless task to tell which one of the many kinds one has without a study also of its flowers and fruit. Often the first leaves coming out in spring are not at all lobed, but later leaves of the same plant may be variously divided. In one trip through the section in which I find these violets I have counted well over a hundred distinct forms judging by leaf shape alone.

As a rule the palmately-lobed leaved kinds of *Viola* are not free flowering and the flowers are quite ordinary, but a clump of any form of them makes an interesting and attractive rockery plant.

The most unusual plant of *Viola palmata* I have ever found bore leaves of three distinct variations with variegated flowers.

ARTHUR H. OSMUN,
Plainfield, N. J.

*Geraniums maculatum, Blue Beauty
and Pylzowianum*

There are some weeds and some very beautiful plants in the *Geranium* family, many of the latter suitable for border or for rock garden. Although some persons may shudder at the thought, in the wild garden in partial shade the native *Geranium maculatum* makes an attractive picture in May and June. Its blossoms vary from mauve, lilac to pale rose and I would not be surprised if a white form would be discovered eventually. Recently I saw an attractive combination in a mountain meadow in the

Alleghanies where this geranium was growing to a height of eighteen inches in front of a large clump *Azalea nudiflora*.

A most beautiful plant for the sunny or partially shaded border is a plant of some eighteen inches or more in height which I purchased under the name of *Geranium Blue Beauty*. It is a most vivid blue and would be outstanding in any border. Likewise it self sows without being invasive and comes true from seed.

One of the choicest gems of the *Geranium* group for the rock garden is *Geranium Pylzowianum*, first introduced by Farrer, I believe, from Tibet. Large pink blossoms are borne all summer on three inch mounds of dainty cut leaf foliage, and although it is said to be slightly invasive in English gardens that has not been true in my garden; even if that were true such a fault could be readily forgiven in such an attractive plant. Apparently it is thoroughly hardy because it is hardy in Vermont and Montana.

R. C. M.

Draba ramosissima

This charming native plant brought to the garden from the shale barrens in Virginia some years ago and planted in a dry scree has annually delighted us with the fine pattern of the ever-green winter rosettes that cover the somewhat woody stems and lie like a pattern of gray lace on the ground. In the spring growth lifts the plant from the earth with a mass of fine small shoots ending in the usual cress-like flowers, fine and white, like a cloud. Individually they are neither large or especially white but taken together they are very fine. So far the plant has shown very little tendency to self-sow which is a matter of genuine regret. It may be the new home is far too shaded.

A Book or Two

A Manual of Aquatic Plants. Norman C. Fassett. McGraw-Hill Book Co., Inc., New York, 1940. 382 pages, illustrated. \$5.00.

The preface begins, "The aim of this book is to make possible the identification of aquatic plants in sterile as well as in flowering or fruiting condition." A word of warning is given about the times when many plants not usually submerged are under water. The author also definitely excludes "bogs", "small woodland brooks, waterfalls, tidal, salt and brackish waters." The territory included is from Minnesota to Missouri and eastward to the Gulf of St. Lawrence and Virginia."

The book begins with a general key which deals with 17 "categories" each of which has a key of its own. That key refers one still further but most often to the final citation. The keys are not too technical for any gardener's use, but the majority of the plants will never concern the gardener.

Hardy Ferns and Their Culture. Edited by Carol H. Woodward. Published by the New York Botanical Garden, Bronx Park, N. Y., 1940. 40 pages, illustrated. 25c.

This booklet comprises "a group of articles and illustrations on ferns which appeared in the Journal of the New York Botanical Garden in March, April and May, 1940."

The articles are: The Life Story of a Fern, by H. W. Rickett; Notes of the Cultivation of Hardy Native Ferns, by Isaac Langlev Williams; Hardy Ferns of Exotic and Horticultural Origin, by Stuart Langmuir; Crested Hartstongue Fern, by T. A. Weston; Forcing Ferns

for Display, by Joseph W. Tansey; Ferns of Antiquity, by Harold N. Moldenke; Raising Ferns from Spores, by T. H. Everett; Fern Diseases and Pests, by B. O. Dodge.

There are many charming photographs that are included in displays, a good short reference list and various matters about the garden. It is essentially a beginner's book and should bait him on to more serious work.

Gardens of Character. Marion Cran. The Macmillan Company, New York, 1940. 284 pages, illustrated. \$3.00.

Like all of Mrs. Cran's books this is a very personal one and of the moment. It was written apparently through 1938 and perhaps 1939. Now it comes to us in 1940. Life moves through it with all that life brings and now we have today. Beauty and growth and learning in all its devious progress are in it; richness for all the senses and the spirit; love of home and of the Empire—all these are here and now it stands in the looming shadow of another life pattern. One is almost moved to tears at the thought—only the sure knowledge that Life continues over and beyond any shadow keeps one to its pages.

Even if all these recorded things move to a swifter destruction than Time might give, they can never be lost if one knows how.

Flowering Earth. Donald Culross Peattie. G. P. Putnam's Sons, New York, N. Y., 1939. 260 pages, wood-cut illustrations. \$2.50.

One of the great problems of life is to know how to convey to one's fellows

the delights of living and to persuade them to a conviction that they too might find beauty and delight in what has pleased one's self. There have been several books of this character in recent months but none that has approached the matter in this vein. Mr. Peattie, if one may judge by his texts, is a believer in the approach on emotional levels and has not much traffic with the impersonal. The title might just as well have been, *The Earth Flowers* for Mr. Peattie.

The reviewer believes just as ardently in the beauty of the earth and has no shame to confess his delights but he finds this book far too ecstatic for his tastes. It has provided a pleasant game in testing the reactions of various persons who move in and out of the usual orbit of his life. It is only fair to confess that there seem to be more who prefer the emotional attitude to those who prefer the dispassionate detachment that the reviewer prefers.

Manual of Cultivated Trees and Shrubs. Alfred Rehder. 2nd Edition, revised and enlarged, 1940. 996 pages. \$10.50.

For the scientist or gardener who has to do with woody plants in cultivation in areas "exclusive of the subtropical and warmer temperate regions" this is an imperative book. This exclusion, of course, works greatest hardship for those living in the Gulf States and along the Pacific Coast.

Aside from the increase in size the book is much like its former self, with most of the same characteristics. About 200 species have been added and various hybrids.

Tree Clearance for Overhead Lines.

George D. Blair, Forester, Consumer Power Company, Jackson, Michigan. Electrical Publication, Inc., 360 N. Michigan Ave., Chicago, Ill. 238 pages, illustrated. \$3.75.

In this book the author states "the object of the volume is to assemble in a clear and comprehensive form for the first time accurate information in dealing with all aspects and problems of wire clearance from trees."

The text is based on the author's study of this problem over the last sixteen years in the official capacity of forester in charge of line clearance work for the Consumer Power Company in Michigan. This is a concise well written book that is easily understood and covers a field that has too long been neglected with a resulting lack of authoritative material in this field. This volume will prove helpful to all who deal with shade tree care and especially those who are with public utilities or governmental units that deal with the problems of overhead lines, roads, streets and shade trees.

The author deals with the entire problem under thirteen chapter headings. These are as follows: Introduction, Overhead Line Construction, Economics of Line Clearance, Proper Tree Care, Tree Formed Heights and Growth Rate, Standard Clearance, Highway and Street Requirements, Laws and Regulations, Public Relations, Trimming, Organization and Personnel, Equipment and Safety Period.

This is an authoritative book that should be in the library of every wire line company, street and highway officials, and available to both office and field force, in this country.

K. D.

The Gardener's Pocketbook

From the Midwest Horticultural Society

Berberis Julianae [See page 179]

One of the few evergreen barberries which may be grown here is *Berberis Julianae*, the Wintergreen barberry. A native of Central China, it was named for Princess Juliana of Holland, and was first introduced in 1900 to England, and in 1907 to the Arnold Arboretum. I am using it in a foundation planting in combination with evergreens. It survived an 18 below zero winter this year, even in an exposed situation, but I would recommend a sheltered situation for best results.

In spring there are yellowish leaves on ruddy green shoots developing into long, closely-toothed leaves, arranged in clusters with three parted rigid spines at the base of each leaf.

The habit of the plant is upright and although my plants have not exceeded three feet yet, it may be expected to reach 5 or 6 feet in a more favorable location. I grew these from year old plants and they have not reached blooming size. The flowers are described as bright yellow followed by purplish fruits.

Stephanandra incisa

From Japan and Korea we have a shrub particularly valuable for its foliage effect, known as the Cutleaf Stephanandra, *Stephanandra incisa*. Since flowers are only of interest a comparatively short time, foliage effect should be a primary consideration in choosing shrubs especially in foundation planting. This slender, graceful bush which grows about 3 feet tall in this locality, looks like a spirea. I had been told that it was not hardy in the North, yet

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as I have found with many other plants of so-called doubtful hardiness, it may be grown quite easily. In the severest winters, only the tips of the branches winter killed and the plant is now 12 years old. A sheltered position would probably be the best advice to give.

The white flowers although small, are borne in great abundance in June and are somewhat fragrant. The leaves resemble small maple leaves and are attractive from spring until frost, turning reddish purple in autumn. Since the foliage comes down to the ground it may be used as a facer shrub in foundation planting or as a specimen plant.

Any average garden soil as long as it is well drained will suit *Stephanandra* and it grows in the sun or shade equally well.

Pinus densiflora var. *umbraculifera*

For use in rockeries or among dwarf evergreens there is a curious Pine which may be used called the Japanese Umbrella Pine, *Pinus densiflora* var. *umbraculifera*. This is a low form of the Japanese Red Pine with spreading branches and a round tufted head, reaching a height of 10 feet. Some nurseries list a form called Tanyosha which is flat on top and even dwarfer in size, growing only about two to three feet high. It is one of the two-needled pines with long, slender light green needles which are soft and flexible to the touch. A rare evergreen of this type will appeal to the connoisseur of interesting novelties.

Halesia carolina [See page 180]

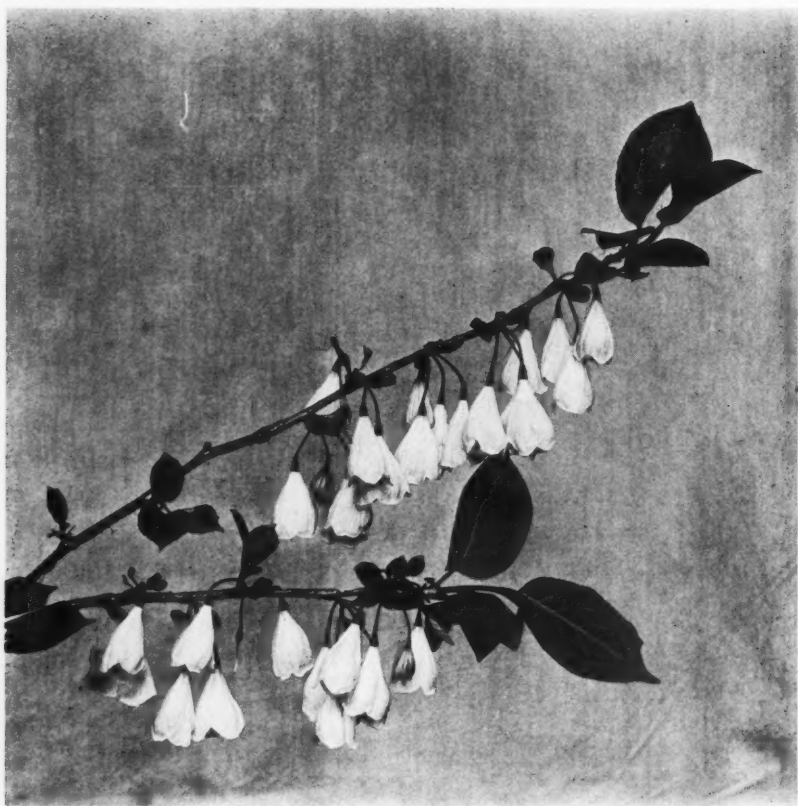
Halesia carolina, the Silver Bell or Snowdrop Tree, is sometimes seen in this area although it is a native of the



Arnold Arboretum

Berberis Julianae

[See page 178]

*Arnold Arboretum**Halesia Carolina*

[See page 178]

South. Its beauty consists of the small white bell-shaped flowers which hang in profusion from the lower side of the branches in May. The flowers appear at about the same time as the leaves.

Fifteen feet is about the limit in height here, making an attractive round headed, bushy little tree, with horizontal branches but rather ordinary foliage. The leaves are about the size of the Mockorange and remarkably free from diseases and insect pests.

They are generally oblong and short stalked, bright green in summer turning to pale yellow in autumn. After the white bells have faded, come queer little green, tapering seed cases. These pale green fruits are rather ornamental against the yellow leaves. The Silver Bell is easily transplanted and may be pruned to bush form where one can study the perfection of the flowers at close range.

ROBERT H. VAN TRESS.

Nyssa sylvatica [See pages 182, 183]

Plant explorers, on trips to far away lands, have returned with many new and interesting plants, some of which have been widely planted in our gardens. As a result we have left unexplored many fine native plants quite worthy of use. One of these is *Nyssa sylvatica*.

Because this tree is a lover of moist ground, Linneus called it *Nyssa* after the Greek water nymph who reared the infant Bacchus; the specific name *sylvatica*, means "of the woodlands." Its common names vary with the locality. The name "Black gum" was probably given to distinguish it from the Red or Sweet Gum (*Liquidambar*) with which it grows and which also has a fiery foliage, leading many to suppose, erroneously, that the two species were related. The name "Sour Gum" came from the blue-black plum-shaped fruits, the acid pulp of which is attractive to many birds and animals. It is also responsible for the name "Pepperidge"—an old English corruption for Barberry, another acid fruit. The mountain folk called this tree of twisted habit, the "wild Pear," while the Indians knew it as "Tupelo".

Nyssa is a medium sized tree varying from 40' to 60' in height. While its form varies, it is always distinctive and strikingly picturesque. The young *Nyssa* is taller than broad and rather formal in character. Its pyramidal habit is not unlike that of a young Pin Oak, with a straight central leader and rather stiff horizontal branches. Sometimes it may even be conical with short horizontal branches the same length all along the trunk. But it is the aged *Nyssa* that is most picturesque. It has now become broader than tall and quite flat-topped. Springing from a short trunk, the broad-spreading lower branches droop toward the ground

while the upper ones are held horizontally. The branches become gnarled and twisted and follow a strange zig-zag course, like flashes of keen lightning in a midsummer storm. At the ends they subdivide into many flat wiry twigs covered with short spurs.

The foliage of the *Nyssa* is its chief charm. In spring the color is a bright green; in summer it is dark green and lustrous from the firm leathery oval leaves 2-4" in length, dark green above and pale below. The earliest of our eastern trees to show fall color, its brilliant scarlet hue is so vivid that only the red swamp maple and the sumachs can compare with it. With the passing of the leaves, the tree takes on the dark gray color of its winter habit. The bark is rough and deeply fissured, grayish to light brown often tinged with red. The roots are very long and descending, with few rootlets, making it a difficult tree to transplant.

Nyssa sylvatica is found from Ontario to Florida and west to Michigan, Missouri and Texas. Its favorite haunt is rich moist imperfectly drained soil along borders of swamps, rivers and ponds, or on high wooded mountain slopes in the South. Somewhat gregarious in habit, it is usually found in groups of its own kind, and in low rich soil becomes almost a forest weed. Its tree neighbors are usually Black Ash, Large Toothed Poplar, Quaking Aspen, Gray Birch, American Elm, Red Maple, Pin Oak and Swamp White Oak. Native Azaleas, Arrowwood, Highbush Blueberry, Chokeberry, Huckleberry, Spiceberry, Winterberry and Shadblow are a few of the shrubs which grow with it, while beneath them will be such herbs as Buttercup, Cress, Crowfoot, Jack-in-the-Pulpit, Loosestrife, Moneywort, Jewel-weed, Violets and a number of moisture loving ferns.

The small home owner will find this tree the unusual one for which he has

*Nelva M. Weber**Nyssa Sylvatica*



Nelva M. Weber

Nyssa Sylvatica

been searching. While its natural habitat suggests low and moist areas, the *Nyssa* can be used in almost any place where a specimen tree of good dark green foliage, flaming fall color and interesting winter habit are desired. As a specimen on the lawn, at the end of a vista or to provide shade for the garden pool, this tree serves equally well. Due to the horizontal line of its winter branches and the horizontal shadows in summer, *Nyssa* harmonizes very well with the lines of modern architecture. Tolerant to adverse city conditions, it can be used in all the most trying conditions. Its fruits are relished by birds so the tree may serve a double purpose in the bird lover's backyard. Neither is it confined to the inland for it tolerates the severe wind and the adverse conditions of the seashore. Park and large estates will find it handsome for groups near swamps, ponds, or stream where the horizontal lines can be reflected in the water. Nearby plants might include Cockspur Thorn (*Crataegus crusgalli*), High Bush Blueberry (*Vaccinium corymbosum*), Bayberry (*Myrica carolinensis*), Shadblow (*Amelanchier canadensis*), Arrow-wood (*Viburnum dentatum*), and Red Maple (*Acer rubrum*). Since *Nyssa* is tolerant to shade it could be planted in groups along woodland paths where good color is desired.

Since *Nyssa* is rather difficult to transplant, only nursery grown material should be used. Balled and burlapped plants 8' - 10' high or less are not hard to establish providing they are given ample water during the first year. Once established, it has no diseases or insect pests and requires no pruning. This alone should recommend it to those requiring a handsome tree with a variety of uses.

NELVA M. WEBER,
New York City.

Aronia melanocarpa var. *grandifolia*

Native from Florida to Michigan is *Aronia melanocarpa*, a weedy shrub as I know it, given to suckering, sending up spindly branches and not growing higher than three feet. In May, it bears umbels of white flowers and in the Autumn shiny black fruits. However, as is so often the case, it has a handsome relative, *Aronia melanocarpa* var. *grandifolia* which deserves wide popularity at the front of the shrubbery. It, too, suckers but the branches are sturdier and send out side limbs, and the flowers are larger. When young the leaves are a glossy green. They are wider above the center, rounded at the tip except for a sudden point in the center, and at the base narrow to a point at the stalk. The margins are pointed and evenly toothed.

The flowers are abundant and grow from new branchlets, off last year's wood and opposite the leaf. The clusters measure $3\frac{1}{2}$ " across and the individual flower $\frac{5}{8}$ ". The clusters are similar to those of the Hawthorne, also a member of the Rose Family but are not as stiff and are prettier. The white buds are tinted pink and little dabs of pink appear at the margins of the white petals which look uneven, as if they had been torn. The stamens spread out in the center of the flowers and the filaments are light rose colored before the pollen appears and point up the flowers attractively.

Indoors the *Aronia* makes a handsome and lasting cut flower. Out of doors it adds to the whiteness of May bloom.

H. M. Fox.

Again, the Crocus

In a climate where winter is uncertain in its departure, the collector of crocus species sometimes finds a whole

sheet of flowers ruined by a late freeze or a flurry of icy snow. Good gambler that he is, he will forget this quickly, remembering the years when all went well and look meantime for buds to come, as not yet sufficiently developed to be uninjured. If, on the other hand, he is cursed by friendly rabbits who can and do invade his garden, there is no help for him except to have so many crocuses that even the rabbits will be sated.

On the sunny hillside where I garden far too casually, it is important that as many plants as possible accept the site as if it were their native heath, flowering in season and withering away with only a decent addition to the ever-deepening litter of small grasses, fallen leaves and the other ground covers of an open woodland. The soil is warm, deep and well drained, supporting a fine native stand of flowering dogwood and masses of azaleas from many different homes. Sheets of narcissus cover it in season, but aside from these features it is only a green hill, touched here and thereby evergreens set in for contrast or for shelter, with no special distinctions save that it gives a home for many delightful small herbs and bulbs.

There have been several assays at crocus growing, none too well planned or carried out, yet singularly successful in some ways. Two species now appear here and there in homes of their own choice and just as vigorously as chickweed, our best and possibly oldest inhabitant. These are *Crocus Tomasini-anus* and *C. Imperati*. Although both came to my hill from nursery stock, it is a pleasant thing to think on a bright cold day in March that the one came from "parts of Dalmatia, Bosnia and Serbia" and that the other spread from "the Bay of Naples southward into northern Calabria." places I have never been but where I should feel quite at home should I see the pale lilac cups

of the first or the glowing red-purple cups of the second.

It may be that one's first Spring sight is keener because of the hunger for flowering, but each of these species will reward the early observer with many variations of hue or of pattern.

Having known first only the garden forms of *Crocus vernus*, the crocus named "by Dean Herbert after his friend Signor Tomasini of Trieste," seemed rather a disappointment as it pushed up its slender buds with long, whitish tubes that were so easily tipped over by wind and rain. Now that it is an old resident, however, and has chosen its own places in the thin wood grasses, it is a special favorite.

The unopened buds are rather pallid, just off white with tones of gray or pinkish lilac, but the inner petals and the inner surfaces of all petals are well tinted in deeper hues of the same tonality. As yet, no seedling has appeared that is really deeper toned toward the tips of the petals to warrant special comment, but a few have come that approximate the exquisite form known as Barr's Purple.

This last is still a newcomer in the garden but shows every sign of staying. The small clump first planted bloomed well and thereafter so much better that it appeared as crowded as a flower show. Purple it is not but rather Chinese Violet which all know is a cattleya-orchid color that carries as pink rather than as lavender. Whether its seedling progeny will be as pink remains to be seen. Close beside it, and equally crowded of bloom, is another selection, Whitewell Purple, which does indeed carry as purple, Manganese Violet of the color chart with a blue tone in the heart that makes the red-violet color shimmer. From this, too, progeny are awaited. But whether seedlings are raised or not, these corms will be lifted

to spread whatever increase there be as quickly as possible.

Quite unlike these are the more substantial forms of Imperato's crocus, which sometimes come to flowering with only a fringe of leaf tips showing and sometimes sits stolidly upon a circle of leaves, often rabbit-cropped. As all should know, the buds of this plant show buff, a mild *café au lait* color sometimes clear and sometimes lined and feathered with so dark a purple as to seem black. The three inner petals and all six inner surfaces are warm rosy-purple hues, some lighter and some darker; some of so thick a substance as to be impervious to light, some thinner so that the whole flower glows when open to the sun.

Like Tomasini's crocus, this plant has also done some wandering but not so far afield. As it seeds freely, a crop was gathered that now is pushing up the soil in several large pots from which two years from now we shall hope to gather some hundreds of small corms to plant downhill from the mother colony.

As compared to these, all the other spring crocuses here are merely upstarts, but among them are several that show every sign of making a new home.

One of the smallest and yet the most brilliant of these is *Crocus Balansac* which has no great size of flower, even among species crocus. The color described by Mr. E. A. Bowles, already quoted and to be quoted again, as "yolk-of-egg-yellow," seems much deeper than that to this eye, but it may be a deceptive matter for the outsides of the outer segments are pencilled and stained with the richest bronze-red color that seems to light up even the yellow within.

Here we have two forms, the type and a selection known as the Zwanenburg variety which differs chiefly in always blooming first and having much

more solid and darker markings on the exterior. There seems to be no difference in vigor nor in increase by corms. As yet no seeds have been observed but they shall be watched for as a great sheet of these glowing flowers would make a marvellous contrast to the yellow cups of the winter aconite which flowers at the same season.

Since *Crocus susianus*, the most easily obtainable species with the same color tonality and general pattern, apparently likes to grow only as a sward of leaves for me, in all the spots discovered so far, it is well that we have the tiny *Balansac* and the larger *C. stellaris*. This latter, while not luxuriating, seems far from feeble and certainly flowers freely in early March with clear yellow, somewhat starry flowers, clearly patterned on the outer surfaces with five feathered veins of purplish brown.

Crocus Sieberi, which is another of the standbys of catalogues, often has the distinction here of being the first to flower, sometimes in late January, but it runs the greater hazard of the weather. Whether for this reason or some other, it never seems as luxuriant as the two species first mentioned, but it is as persistent as they in terms of years. Although it is known to have some geographic forms, in trade it seems to be essentially the Greek form with self-colored lilac flowers that open to show an orange throat.

Much later in flowering and in no way related to it save in color tonality is *Crocus etruscus* of which two clones are grown, both differing somewhat from the botanical descriptions and so falling under some doubt. Related to *C. Imperati*, the type should have buff-colored outer petals, but may have "more green than buff in its outside coloring." Those grown here are so gray as to appear almost self lavender and the Zwanenburg variety, which here is even more vigorous and florif-

erous, seems almost a clear gray lilac. If it will seed, there shall be hundreds more, this early March bloom found only "in the Tuscan Maremma," and then perhaps there will be variants, some even with outer featherings as in its cousin.

Although there are many other spring-flowering crocus species, part of which at least are available in commerce, before we lose ourselves among the forms and hybrids of *C. chrysanthus* it seems only decent to mention the beauties of *C. biflorus*, rather modest beauties in most cases but fair enough in such as the white form of *C. biflorus Weldenii*, itself a lovely white flower tinted without with strange gray-blue washes.

The corms received as *C. biflorus* yield a grassy tuft of leaves through which rises successively the neat little flowers, white within, but with their outer surfaces flushed with faint yellow and pencilled with bluish-purple featherings. The form grown as *biflorus argenteus*, as it flowers here, is not properly "pale lilac within" but almost as white as the type. The exterior, however, is quite properly yellowish. Even this small flower eclipses the still smaller but much later *biflorus pusillus* of not dissimilar color and pattern. It may be that if the rabbits loved them less, we should know them better! Of much greater stature and better dimensions are *Weldenii* and the *Weldenii albus* mentioned before. If these come to flower as freely as *C. Tomasinianus*, also from Dalmatia, they may make the white species for the spring.

It seems quite doubtful that I have ever had a corm of *Crocus chrysanthus* for it is difficult to be sure after reading the descriptions of the named clones, which one may safely assume are variants found in nature and propagated as such, which are seedling selections of pure lineage, which are seedling selec-

tions of uncertain ancestry, which are forms of supposed or known hybrid origin in which *chrysanthus* has left such specific traces as to warrant their inclusion under its name.

Unlike most species that are typically yellow, this variable wild plant from "the Bithynian Olympus, in Turkey and in Greece" is reported to have lilac-colored forms, with whites as well.

Of all the garden forms, the only named clone with botanical standing is *C. chrysanthus fusco-tinctus*, a rather dull name for a starry flower of deep yellow inside, the outsides of the three outer segments washed and pencilled with dull, almost bluish browns such as one finds in some breeder tulips. On a chill morning one sees little till the sun has opened their starry faces.

In the garden parade, the variety that comes closest to this is Dorothy, almost its counterpart, but one degree lighter in the inner yellow and one degree bluer in the outer pencillings. Quaintness is one degree paler than Dorothy and brings one to a turn in the procession. Here stands Siskin in which the inside of the flower is white but the outside of the three outer segments is pale yellow feathered and flushed with warm bronze. Deeper still in feathers and flushes with scarcely any yellow undertone is Bullfinch, and whiter still and less marked is Large Warley White. Such a sequence as this may be utterly unjustified from parentages, but serves as a sort of guide to the beginner. All have the inner basic cup of rather dull yellow.

Another series might be made up of those clones that have rather larger rounder flowers and less pattern. Of these Snow Bunting is the palest, practically white aside from the inner yellow base, with almost never a shading on the outer segments. E. P. Bowles is much like it in form but clear yellow and Canary Bird, curiously, is an even

darker yellow. E. A. Bowles is much like E. P. Bowles but a clearer softer yellow and of a better size and stature, while Moonlight is one degree deeper but not so dark as Canary Bird and without the contrasting yellow inner base. All of these varieties are sweetly scented, which is not true of the first series, except in a faint degree in Siskin, Bullfinch and Large Warley White.

One single blue-flowered clone is grown here and that a newcomer, apparently stingy of bloom as yet. The one Blue Butterfly that developed was a finely modeled flower of pale violet with a patch of Hyssop Violet at the base of the three outer segments. Of scent there was almost none. Even so, this variety rather outshone the clone of *C. aerius* Grey Lady near by with white blooms flushed over with the pale bluish lavender deepest toward the edges and tips and with outer veins and featherings of Hyssop Violet.

Even as species crocus go, these *chrysanthus* clones are not large flowered, but the corms are sufficiently floriferous to more than make up for lack of size.

If they can be kept at a distance from the large and easy *C. aureus*, they are not apparently undersized, but if they must look great, they should be planted near the smaller *Balansae*.

As with the usual garden crocus, the foliage of all these species withers by June. If seed pods are formed, they will have pushed up before then. Should the seed be saved, the pods should be gathered before they burst and allowed to open where the seed will not be lost. If the seed is sown soon thereafter and kept in a cold frame or cold pit over winter, it will germinate in March, giving a pot full of fine grass-like leaves. As none have been deliberately grown to flowering here, it can only be repeated that three or four years will elapse before flowering be-

gins, a mere nothing if one wonders what new variant will appear and make February or March an even gayer month.

B. Y. M.

Babiana plicata

Babiana plicata is an exceedingly pretty and a very useful little winter flowering bulb for the greenhouse, conservatory or window sill.

The color of its dainty flowers is quite uncommon for bulbous plants that bloom at this time of year. They are a beautiful pale blue shade, in which there is a slight hint of lavender, and shade to white toward the center of the flower.

The six-petalled blossoms open out flat and are about 1½ inches in diameter; and as they are plentifully produced, they remain in bloom for some time.

The unusual looking, plaited foliage is most ornamental and does not flop and I have never known the stiff flower stems to bend the least bit.

B. plicata grows only 8 or 9 inches high and as the bulbs can be planted fairly closely, a pot full is a most effective ornament for the window sill.

The cultivation of these little bulbs is very simple, but they need to be started into growth rather early in the autumn like most Cape bulbs.

They like a light, rich soil mixture, and require full sun.

The flowers are a deeper blue when grown under fairly cool conditions.

B. plicata is very easily grown from seed and blooms the following year, after which it is conveniently and quickly propagated by offsets.

In *Nicholson's Dictionary of Gardening* its date of introduction is given as 1774.

Perhaps there are others, who like myself, do not have the conditions at

hand which freesias demand so rigorously, in order to succeed to perfection.

Perhaps there are others who enjoy, as I do, the pleasure of raising and growing, quickly, too, their own flowers from seed.

Then also, some will like the enjoyment of having pleasant flowers that are a little out-of-the-ordinary, but not difficult to grow.

Let these persons try *B. plicata*. They will not be disappointed if they give these very delightful little bulbs a chance, for they will then open out and show the fair flowers within.

MARY G. HENRY.

Gladwyne, Pa.

Prairie Wildlings for our Gardens

While the prairie country calls to our minds a perfectly flat plain, and no doubt, viewed from an aeroplane, would present much that aspect, yet in traveling over it we find surprising variations. In miniature, it is a cross-section of the world, for it has its little hills and rocky canyons; modest woodlands and swampy meadows; stream sides and sandy wastes; all of which have their own particular flora. So that the prairies have a wonderful variety of plants. Nearly all of which can be made to accommodate themselves to garden conditions if we take pains to reproduce as nearly as possible their natural soils and surroundings.

Penstemon (unidentified), smooth light green leaves with a delicate bloom. The ground leaves, which grow in a low cluster, are evergreen. The flower stem rises to a height of eighteen inches or more and are thickly clothed for more than half their length with light lavender tubular flowers about an inch in length. "Lavender Spikes" is the name which we have always used for them and it describes them as perfectly

as possible. This penstemon grows wild in pure sand and in sandstone soil but it does beautifully in ordinary garden loam, in fact, is one of the easiest of the natives to domesticate.

Penstemon cobea, is another beautiful beards-tongue, with large heads of nearly white foxglove-like flowers freely spotted within. It is one of the largest-flowered members of the penstemon family. The leaves are dark green, and slightly notched. This penstemon grows in the shallow soil above the slabs of sandstone but it, too, will live in the garden soil, though not so happily as the first mentioned.

Wild Lupin. The sand hills are a beautiful sight in late summer when the lupins are in bloom. Everywhere you look is a sweep of deep blue lighted here and there with a clump of cream colored spikes. The stem is quite stout, erect, and branched, making a most symmetrical clump with often a half dozen large waving clusters of pea-shaped flowers. The leaves have long slender stems; the leaf, proper, is divided into seven to eleven narrow smooth-edged leaflets. It is a most discouraging plant to dig for the root goes down, down, down; I have no idea how far. In a sandy bed in full sun in the garden it grows and flourishes, every year seeming stronger.

Wild Leek, beautiful rose-pink flowers in a flat umbel on stems from four to eight inches tall, often as many as ten or twelve in a clump. The leaves are very fine and rounded, a dull greyish green. They bloom early in the spring growing in prairie sod and occasionally by the roadsides. A field of this leek in bloom is one of spring's most beautiful sights, though the farmer does not appreciate its beauty, especially if he has milk cows. The flower is slightly fragrant unless crushed and then the onion smell is most pronounced. The root is a small onion-

shaped bulb covered with a tough web. They increase very rapidly from both seed and bulb.

The phlox family is well represented among the wild flowers and all of them are beautiful, but I think the prairie phlox is one of the finest. The big, flat heads of sweet-scented flowers are at their best about Decoration Day and make the best of cut flowers. In color, they range through nearly all shades of pink, many with contrasting eye. One occasionally finds white, too. They grow in the open grassy land but adapt themselves very readily to the home garden where they are even larger than in their wild state. Ordinary garden loam is very satisfactory to this phlox.

Among the crevices of the rocky bluffs in sandstone soil, grow the grey, hairy-leaved tradescantias with their big three-petalled flowers but a few inches above the ground; in fact, sometimes resting on the ground. They come in shades of purple, clear coral pink and occasionally pure white; fine for the rock garden.

Tradescantia virginiana grows about eighteen inches high, has smooth bluish-green blades and stems and is at home in the sand hills and neighboring black ground. Its colors are pure sky blue, a color very rare except in the forget-me-nots, and a rare white or pure rose pink, but none have a trace of purple. These are very adaptable garden plants but cannot endure fertilizing.

MRS. H. P. MAGERS.

Iris tectorum

Several years ago I bought *Iris tectorum* in both blue and white. I kept a bit of each in a pot in the house, "just in case," and set the rest out in what seemed a good situation;—or it seemed so to me. It didn't to the Iris. The pieces in the pots increased more or

less, but never blossomed until this spring, when I had two most lovely white flowers. Last year I set two more pieces out-of-doors, and a short time ago discovered that one of them had four flower stalks. So they will live and bloom out-of-doors here, if they feel like it!

The foliage died down almost completely during the winter, but began to grow vigorously as soon as the snow went. The plants are close to the little rock edge that is used around the beds in part of the garden, in a rather shady place having some sun in the afternoon, and in ordinary good garden soil, with a little extra dose of leaf-mould. They had no mulching except a few apple leaves which drifted around them, and snow from early January to the second week in April.

Most of the foliage dies down on the potted plants, and it seems best to be rather sparing of water until growth starts again.

The white form, with its exquisite texture and glistening whiteness, appeals to me more than the type, but that is pretty, and decidedly interesting. It is a flattish flower, somewhat spidery in effect, like so many of the *Iris* species, and about four inches across. The hafts are slim, not more than an eighth of an inch wide in the standards, which do not stand up much at any time. The blades widen rather abruptly, to about an inch wide by an inch and a quarter long in the falls, and somewhat less in the standards. Looking down upon the flower, I am somehow reminded of a snow crystal.

The color is a medium lavender, the falls streaked and dotted with a darker shade. The hafts are white, marked with brown purple. The rather prominent crests are almost white, oddly spotted with small dashes of so dark a purple as to seem black to a casual glance.

The stalk reaches a height of ten inches or so, and bears two flowers, which are just enough above the foliage to be well exhibited, though later on the leaves grow somewhat taller. The individual flowers will last four or five days, if the weather is cool.

The leaves are about an inch wide at the widest part, thin, ribbed, and of a paler, yellower green than most Iris leaves. The rhizomes are quite shallow rooting, so that it is often necessary to anchor them when repotting. Mrs. McKinney says that the best time to move them in the garden is after blooming, which here is the middle of June, or in August.

The story is told that the women of Japan made a cosmetic from this Iris. In time of war, it was ordered that all the land be used for the growing of food, but the women, not to be outdone in so important(?) a matter, conceived the idea that the shallow rooted plants might grow on the thatch of the roofs;

—from which procedure this is known as the Japanese roof-iris.

One year's blooming is no guarantee of another's, but I hope, now that they have begun to bloom, they will continue to do so.

Looking in my records to see when I bought the plants, I find that it was in 1929!

RACHAEL CAUGHEY.

Antrim, N. H.

Berberis Julianae

The shrub grows fairly slowly here. It is perfectly hardy and grows facing North as well as in an eastern exposure, in the sun and on neutral soil. The shrub keeps its leaves fairly well during the Winter. When young, it is somewhat ungraceful in the stiffness of its branches but the large glossy leaves are handsome.

H. M. Fox.

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